MODEL AIRPLANE NEWS

OCTOBER 1954—35 CENTS

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William Wylam Masterplans

EARLY BOEING FIGHTERS

•

SCRAMBLER—Team Racer

•

SKYRAY—For Jetex Power

DOUGLAS SKYHAWK

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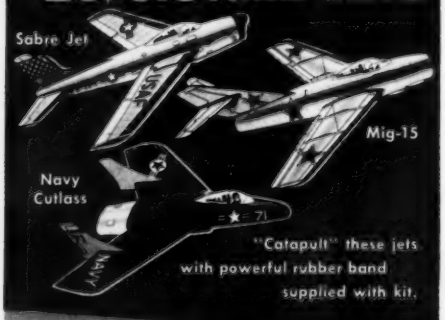

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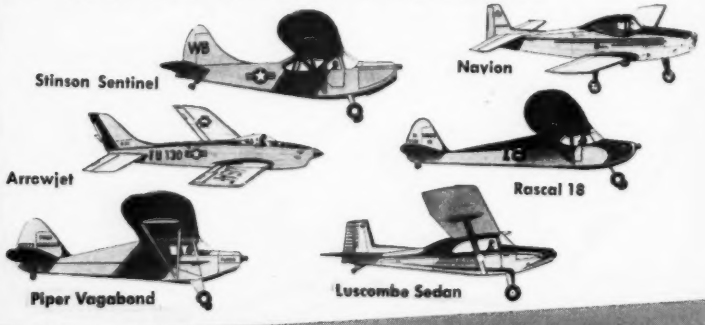

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MODEL AIRPLANE NEWS

26th Year of Publication

OCTOBER 1954 Vol. LI—No. 4

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Printed in United States

by William Winter

▶ The month of July—during which the October issue staggers to press—is the tough one. It's as hectic as free flight at 11 o'clock thermal time, or C speed a half hour before the meet closes. At the deadline for the October issue, that sacred point-of-no-return with which one tampers at risk of becoming unstuck, what happens? On the week-end of July 26-27, Sunday and Monday actually, the FAI and Wakefield competitions were scheduled out on Long Island, about 75 miles from New York on a magnificent Air Force Base (Suffolk). Then, on Wednesday, the biggest Nationals in history got underway at Glenview Naval Air Station, north of Chicago, and rocked along in the greatest din of model engines ever heard anywhere, until the following Sunday night, with weather so hot even the bake-proof Kansans and Texans protested.

Now it is a 25-year tradition that the Nats be reported in the October issue. But this year, in view of the Internationals Meet, and the biggest-ever Nationals, the twin coverage appears in next month's issue. Old friend Bill Dean, whose coverage of international events appears in MAN from time to time, came over from Britain to work with us, taking hundreds of pictures of models and modelers, and to sneak in a few Nordic flights at the Nats. Pending next month's coverage, a list of first place winners of the Nationals will be found on page 7, and winners of both FAI and Wakefield, down to tenth place, on page 53. In November, Bill Dean describes the International event and yours truly, the Nationals.

* * *

▶ One of the wonderful things about this model airplane hobby is the never-ending stream of ideas. Someone is always suggesting a new event, or a change in an old one. Whether (*Continued on page 6*)

PLANE ON THE COVER

The Douglas A4D Skyhawk may look like a fighter but it's really a bomber, capable of crossing the U.S. non-stop or carrying an atom bomb from a Navy carrier deep into the heart of the enemy land. Pictured here making good a getaway, against a mushroom cloud background, the A4D is nicknamed Heinemann's Hot Rod, after the Douglas designer whose faith in the lightweight, small, fast fighter-like, bomber made possible history's deadliest plane, pound for pound. Spanning only 27 ft., A4D does not need folding wings to use carrier elevators.

NEXT MONTH'S COVER

Possibly the most dreaded and often remembered fighter of the first World War is the German Fokker D-7. Like other fighters of the era it was small, spanning less than 30 ft. So sturdy was the D-7 that it was seen as late as 1934 in various commercial usages. A 160-180 hp Mercedes engine was standard. Two synchronized Spandau machine guns fired through the prop.

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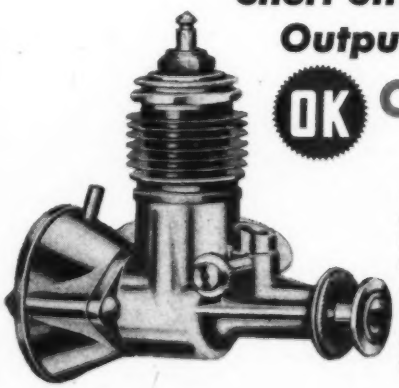

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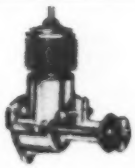

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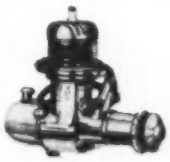

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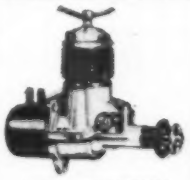

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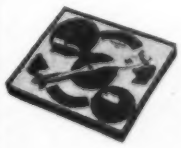

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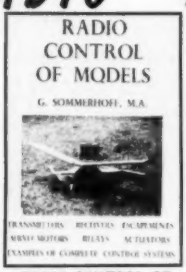

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"RADIO CONTROL OF MODELS" Another fine book by Mr. G. Sommerhoff (Not part of 3 book series). Book is excellent introduction into all types Radio Work. Has Two Tone cover Contains 43 Photos and Schematics of all types of equipment. Shows 25 inch Model Boat with 22 DIFFERENT CONTROLS all off a ONE TUBE RECEIVER, having rudder, Speed, gun, torpedo, Radar Screen all under control plus many other operations all from its one tube unit. Radio Controlled JEEP also given. Delay Action Relays. Self Zeroing Selector Switches, Reed units. Pulse Rate units. Controls via long and Short Pulse units etc. Do Not let the low price of this book mislead you as it contains many many new items never before shown in any other book regardless of price.

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Edited by HARVEY A. ADAM Naval Architect a LARGE CLOTH BOUND volume (page size 12½" x 9¼") Plans are given for RADIO CONTROLLED Boats (plans open out to double page size) 47" Fairlie Bluff, 51" Twin Engine Cruiser, P. T. Boat, British M.T.B. Racing Hydroplanes and Sailing Yachts also shown plus prop design charts, Engine Cooling methods, Radio Rudder self centering controls, Hull Const. methods etc. You can build any boat from the plans and beautiful photos in this book with confidence.

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GULL MODEL AIRPLANE CO., 10 EAST OVERLEA AVE., DEPT. M BALTIMORE 6, MD.

MAN at Work

(*Continued from page 2*)

or not anything comes of the ideas troubles no one, but the debates that result we could never do without.

Thought Joe Wagner was crazy when he suggested a 60 second motor run. Yes, 60 seconds! Joe's the guy who created the Veco Dakota, that amazing little all-wood free flight biplane with the U-control prefabricated timber construction. Now he is with Ken-hi. Joe, it seems, would like to revive the Buzzard Bombshells, Comet Clippers and the other great airplanes (or develop ones like them) that were banished forever by the short motor run rule. A lot of people still like to heave the old "sport" jobs, so let's test fly Wagner's startling suggestion.

When, during the early 'thirties, the first free flight contests got underway, it was quickly recognized that some limitation had to be placed upon duration. Timers used to hop on cars and vanish with the flier for hours on end. Planes could get half way across a small state. Timers were told not to leave the spot, and 1/4 oz. of fuel was allotted to 1 lb. of airplane weight. This gave way to an 1/8 oz., then to the 30 second motor run, then 20, or less. The ironical thing was that performance got better and better. The short motor run simply emphasizes the climb and this led to hotter and hotter engines. With climb the magic factor, things happened to the airplane. Carl Goldberg revolutionized design with his pylon Zipper, which opened the way to straight-up, in-the-groove climbs. Although the clock can never be turned back, or progress washed out, it is possible, nevertheless, that the long motor run may produce a different airplane.

As Wagner sees it, the flier would receive no time if the airplane flew out of sight. There would be no other rules. Use any engine you want, make the plane big or little, power it with an .02 or a .99. Make it a cabin, a biplane, or anything you want, but the engine must run at least 60 seconds and the plane must come down in sight.

Since it is a well known fact that anything that glides—which is to say that the plane does not come down in a dive—can catch a thermal, 60 seconds' engine run is something to think about. But if you don't want the ship to go out of sight, you'd probably stick a dethermalizer on it, and otherwise modify design to slow up performance and cut down on glide duration. No one is suggesting a new event, or implying that the present free flight set-up should be scrapped. But Wagner's idea looks like a worthwhile, fly-for-fun deal to be experimented with by clubs, at least as novelty events at small contests. After that, who knows?

* * *

▸ With a year's trial of the new FAI and Wakefield rules under our belt it looks as if the double-domed rulemakers have chucked a boomerang. We refer primarily to the five-flight idea, with a three-minute maximum. Of course, it is always easy as a matter of hindsight to point a critical finger, so let's consider briefly the background that led to the present rules. Last winter MAN at Work had an enlightening discussion with the Aeromodeller's C. S. Rushbrooke.

"The whole idea of reducing the maximum and putting up the number of flights is twofold," Rushy wrote us. "First, in order to contain as far as possible the models within reasonable aerodrome limits, thus diminishing the chance of trespass and, secondly, to put a premium on consistency rather than the old lucky thermal flight.

"While imposition of the five-minute limit definitely assisted the consistency angle," Rushy went on, "it is obvious that many countries are coming up against the long distance retrieving-cum-trespass angle, hence the endeavour to offset this by cutting down maximum allowable. The models themselves

(*Continued on page 54*)

INDOOR

Stick: Open—Richard W. Obarski, 1245.0; Sr.—Raymond B. Harlan, 842.0.

Cabin: Open—Bob Bienenstein, 865.2; Sr.—Lewis G. Groebe, 269.0; Jr.—Roy Richards, 260.0.

Hand-launched glider: Open—M. D. Andrade, 51.0; Sr.—Curtis Mincier, 51.6; Jr.—D. Goetziwger, 39.9.

GLIDER

Hand-launched glider: Open—Lawrence Conover, 589.0; Sr.—Bernard Boehm, 289.0; Jr.—Bob Wenenmacher, 300.8.

Towline, Limited: Open—L. J. Kretovics, 641.2; Sr.—Gareta E. Lucier, 353.1; Jr.—John F. Watson, 730.7.

Towline, Nordic: Open—James Patterson, 816.1; Sr.—Paul Crowley, 600.2; Jr.—P. A. Hartman, 554.5.

RUBBER

Wakefield: Open—Bob Bienenstein, 896.2; Sr.—Jim Bowers, 823.4; Jr.—Joseph White, 652.6.

Limited: Open—Edward Krause, 745.5; Sr.—Don Kintzels, 573.8; Jr.—Jack Koontz, 553.1.

FREE FLIGHT

Half-A: Open—Gabriel Martinez, 1063.3; Sr.—B. L. Broadwell, 893.2; Jr.—Darryl Katz, 914.0.

Class A: Open—Jack Oxley, 999.0; Sr.—William Gelvin, 961.0; Jr.—Tommy Stafford, 830.0.

Class B: Open—Earl H. Anderson, 1072.2; Sr.—Robert Cherny, 996.8; Jr.—David A. Brownlee, 631.0.

Class C: Open—James G. Pitterson, 1750.2; Sr.—Don Helfers, 1014.8; Jr.—Martin Wolff, 810.2.

ROW: Open—Sherman Kachenberg, 1010.0; Sr.—Robert Chuny, 813.0; Jr.—Dave Yust, 564.5.

Half-A Scale: Open—Ed Stoll, 344.5; Sr.—Paul Crowley, 354.2; Jr.—Jim L. Watson, 143.6.

PAYLOAD

Rubber-powered: W. S. Blanchard, Jr., 296.3.

Cargo Half-A: Herbert K. Kothe, 25.50 oz.

Class AB: Open—Bruno Markiewicz, 828.4; Sr. and Jr.—Robert Patchin, 543.2.

Half-A: Open—Joseph Ziomek, 895.2; Sr. and Jr.—Joseph Ziomek.

CONTROLLINE

Speed Half-A: Open—Verner Kurth, 80.61; Sr.—W. E. Vrablic, 85.60; Jr.—Martin Maciag, Jr., 72.43.

Speed A: T. P. Baker, 130.19; Sr.—Walter Vrablic, 126.71; Jr.—R. H. Giles, 122.90.

Speed B: Open—Robert Elliott, 136.93; Sr.—Ken M. Hale, 131.43; Jr.—Clifton Medlock, 126.80.

Speed C: Open—Randall Cullin, 159.37; Sr.—Ken M. Hale, 152.22; Jr.—Robert H. Gites, 143.14.

Jet: Open—Sigmund Danowski, 152.09; Sr.—Gerry L. Blake, 151.33; Jr.—Michael Dawson, 143.25.

Stunt: Open—D. Still, 349.8; Sr.—C. Hill Hutchins, 352.0; Jr.—R. B. Pharis, 346.5.

Flying Scale: Open—Robert Yeomans, 329; Sr.—J. McCrosky, 311; Jr.—Jose Pinero, 183.

Combat: Open—Frank Adams, 540; Sr.—Miss Shirley Ann Austin, 860; Jr.—William S. Trevisan, 540.

Team Racing: George Meir.

U. S. NAVY CARRIER

Open—William F. Netzeband, 385.5; Sr.—Dave Domizi, 417.4; Jr.—Robert C. Hemingway, 361.9.

RADIO CONTROL

Alex Schneider—67, 116, 183.

HILLER HELICOPTER

Parnell Schoenky, 130.66.

Of the dozens of events held at the Naval Air Station, and Chicageland Airport, none was more fun, spectacular than combat in controlline.

1954 nationals

▼

Results of the 23rd Annual "Big" Meet, held at Glenview Naval Air Station, July 28-August 1.

WHO WON?

National Champ.....W. S. Blanchard, Jr.
Open.....W. S. Blanchard, Jr.
Senior Champ.....William Gelvin
Junior Champ.....Joseph White
Club Champ.....Oakland Cloud Dusters

Over 1,500 sunbroiled contestants made the meet into a flying circus. Most of them got in their hops in the free flight events. Real thermals.

NEWS F-L-A-S-H-E-S

direct from the 1954 NATIONALS . . .

MORE NATIONALS CHAMPS WON with TOP FLITES and POWER PROPS THAN THE 4 OTHER MAKES COMBINED!

HERE'S WHAT THE CHAMPS USED TO WIN!

Here's a real flyer—BOB CHERNY of Sacramento won 2 BIG FIRSTS. Above, Bob shows his Cl. B Senior winning WHOZET, powered by a K & B 23 . . . time 16:36.8 . . . fuel, Ohlsson Gold Seal ½A. PROP . . . 9-4 TOP FLITE! See his other 1st below.

Young ROD PHARIS really showed 'em a beauty with his original JUPITER. Bagging 346.5 pts. in Junior Stunt, he fueled his Fox 35 with Power Mist and swung a 10-5 TOP FLITE PROP. Detroit and TOP FLITE are mighty proud of Rod.

Happily winning the helicopter event for the 2nd straight year is "PAR" SCHOENKY of Kirkwood, Missouri. Cheminol AA was the bang-water for his Atwood .049 and O. K..14 engines . . . and he really got nifty lifts with his 6-3 and 9-4 TOP FLITE PROPS. That's Carl Goldberg of TOP FLITE on the left.

Detroit comes thru again with ED STOLL, who repeated his 1953 win in Cl. ½A Scale Open. This year, Ed amassed 344.5 pts. with his beautiful flying Fairchild. His engine was a Wasp . . . fuel, Cheminol AA . . . PROP, 6-3 TOP FLITE.

SPECIAL FLASH!

International FAI Gas Winner and World Champion Uses Top Flite Prop!

Here he is—CARL R. WHEELEY of Washington, D. C. In the world's most grueling gas model competition, held on Long Island, July, 1954, Carl beat the best from many nations with his Senator, smashing home with 844 sec. Engine, Torp 15.

Fuel, K & B 1000. PROP—and we're really proud of this one—an 8-3½ TOP FLITE!

In 1952, ALEX SCHNEIDER of San Francisco won Radio Control with his 5-Channel Rockwood Set and original Piper Cub. This year, Alex dominated the field again with 183 pts. Engine, Spitfire 60. Fuel, gas and oil. PROP, 14-6 TOP FLITE.

FREE FLIGHT GAS

Cl. ½A Junior
Darryl Katz
Detroit, Mich.
Time 15:14
Engine Atwood .049
PROP 6-3 POWER PROP
Fuel Thimble Drome Racing
Plane Fuber 36

Cl. ½A Open
Gabriel Martinez
New Orleans, La.
Time 17:43.3
Engine Atwood .049
PROP 5½-4 POWER PROP
Fuel O & R #2
Plane Modified Kiwi

Cl. ½A Scale Junior
Jim Watson
Fort Des Moines, Iowa
Engine Wasp
PROP 6-3 TOP FLITE
Fuel Thimble Drome
Plane F. W. Stosser

Cl. ½A Scale Senior
Paul Crowley
Detroit, Michigan
354 pts.
Engine Wasp
PROP 6-3 TOP FLITE
Fuel O & R AA
Plane Aeronca

Cl. A Senior
Robert Galvin
Topeka, Kansas
Engine K & B Torp 19
PROP 10-3-½ TOP FLITE
Fuel K & B 1000
Plane Spacer

Cl. B Junior
David Brownlee
Stone Mountain, Ga.
Time 10:31
Engine K & B 23
PROP 9-4 TOP FLITE
Fuel Home Brew
Plane Spacer

Cl. B Open
Earl Anderson
South Bend, Ind.
Time 17:52.2
Engine O & R 23
PROP 9-6 TOP FLITE
Fuel Nitro-X
Plane Gaffy 1

Cl. C Senior
Don Helfers
Arlington Heights, Ill.
Time 16:54
Engine Torp 32
PROP 10-6 TOP FLITE
Fuel O & R AA

Row Senior
Robert Cherny
Sacramento, Calif.
Time 13:33
Engine K & B 15
PROP 8-4 TOP FLITE
Fuel Ohlsson Gold Seal ½A
Plane Lancer

Row Open
Sherman Hackenberg
El Paso, Texas
Time 16:50
Engine K & B 15
PROP 8-3-½ TOP FLITE
Fuel K & B 1000
Plane Original—My Sin

CONTROL LINE

Stunt Open
Don Still
Beaumont, Texas
249.8 pts.
Engine Fox 29
PROP 9-6 TOP FLITE
Fuel O & R Hellzfyre
Plane Stuka

Combat Junior
Bill Trevison
Detroit, Michigan
540 pts.
Engine Fox 35
PROP 10-6 POWER PROP
Fuel Power Mist
Plane Original

Combat Open
Frank Adams
New Albany, Ind.
Engine K & B 35
PROP 10-6 POWER PROP
Fuel K & B 1000

Flying Scale Junior
Jose Pinero
Hato Rey, Puerto Rico
183 pts.
Engine Cameron 19
PROP 5-6 POWER PROP
Fuel K & B 1000
Plane Cessna Bird Dog

Flying Scale Senior
J. McCrosky
Iredell, Texas
311 pts.
Engine K & B 32
PROP 9-6 TOP FLITE
Fuel Power Mist
Plane F-51

Flying Scale Open
Robert Yeomans
West Haven, Conn.
329 pts.
Engine Two K & B 29's
PROP 9-6 POWER PROP
Fuel Hellzfyre
Plane P2V2 Neptune

Speed Class ½A Junior
Martin Maclag, Jr.
Matawan, N. J.
Time 72.43 MPH
Engine Thermal Hopper
PROP 4-½-7 POWER PROP
Fuel Hellzfyre

U. S. Navy Carrier Senior
Dave Damlzi
Rocky River, Ohio
417 pts.
Engine Fox 35
PROP 9-7 TOP FLITE
Fuel Cheminol XL-2
Plane Grumman AF2-S Guardian

PAA LOAD

Cl. ½A Jr.-Sr.
Joe E. Ziomek
Allen Park, Mich.
Time 13:25
Engine Space Bug
PROP 6-3 TOP FLITE
Fuel Nitro-X
Plane Original

Cl. ½A Open
Joseph Ziomek
Allen Park, Mich.
Time 14:55.2
Engine Space Bug
PROP 6-3 TOP FLITE
Fuel Nitro-X
Plane Original

Cl. AB Open
Bruno Markiewicz
Detroit, Mich.
Time 13:58.4
Engine Torp 19
PROP 9-4 TOP FLITE
Fuel Nitro-X

LOOK for this famous PROP CABINET at your dealer!

For LONGER, FASTER, BETTER flights, get TOP FLITES and POWER PROPS . . . year after year the world's biggest-winning . . . best-selling props.

TOP FLITE

TOP FLITE MODELS, INC.,
2639 S. Wabash Avenue, Chicago 16, Illinois

Sleek, drag-killing lines of the Scrambler will give you either more speed or more laps to tank. Fuselage lines actually plotted from NACA 0009 airfoil; thin, elliptical surfaces highly efficient.

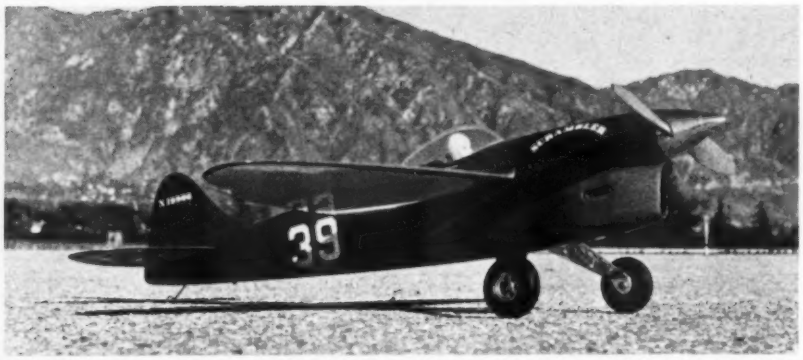
MODEL AIRPLANE NEWS • October, 1954

SCRAMBLER

By LES McBRAYER

▼

A pioneer of team racing presents what may be the finest racer yet published. Article is packed with hitherto secret info.



Prettier than a picture. This clean job pointedly combines speed, economy, stability and ruggedness, all absolute *musts* for the successful team racer. The color scheme is white and a metallic green.

Froom spinner and McCoy extension spool account for compact, clean nose design .Grooved tires help prevent model "walking" in the stooge when motor is running, when fuel gets on the pavement.

Scrambler was designed with four specific features in mind: high degree of streamlining, good appearance, take-apart construction and an electrical cut-off system.

Good streamlining in a racer means less drag and either more speed or more laps per tank. The fuselage lines are plotted from an NACA 0009 airfoil, while the wing and tail are elliptical, with a very thin section. These pleasing outlines, when added to a good finish, will win extra beauty points to help put your model in the Feature Races. A successful team racer must combine speed, economy, stability, ruggedness and an easy-starting engine to an unusual degree.

Take-apart construction means that every component of the model can be unbolted and removed. The fuselage splits full length with the engine, tank, cut-off, wing and tail attached to the top half. The landing gear and tail skid are bolted to the bottom half. This construction permits visual inspection of every part at any time, and greatly simplifies the repair or replacement of any component. Experimenting with different wings, landing gears or tails is an easy matter.

An electrical cut-off provides engine control at the push of a button. The engine can be cut without the antics common to bellcrank actuated devices. In many cases where a model is flying with a sour adjustment, or where it cuts across the circle on take-off, this system will stop the engine where the bellcrank type cannot. Blipping the cut-off will effectively slow down the flying speed if desired. This cut-off cannot be left "off" accidentally while trying to start the engine.

The take-apart construction of the Scrambler causes some complications in building. These may be eased a bit by using a two-block hollowed fuselage along with the usual built-in engine bearers and a hatch removable back to the rear of the canopy. The construction of the original model as shown on the plans will be described below. In all cement joints, be sure to pre-coat the parts and allow them to dry before putting them together. Of course, a fuelproof cement should be used at all times.

The wing is solid balsa shaped from 3 and 4 in. wide hard sheets 3/8 in. thick

and edge-cemented together. Draw the elliptical pattern on the panel and saw to outline shape. Sand the bottom surface until the wing panel thickness is tapered from 5/16 in. at the root to 3/16 in. at the tips. On the top surface, mark the center section and leave all of this area flat while the rest of the wing is sanded to a thin flat bottom airfoil as shown. Small fillets made from plastic balsa should be made to fit along the center section.

Cement a lead weight about 1 or 1-1/2 oz. (fishing sinker, flattened) into the bottom of the right wing tip. Groove the bottom surface of the left wing panel and cement in the guide tubes. Use plastic balsa to cover any low spots and then sand smooth. Cut the center section stiffener from plywood and inset flush with the bottom surface of the wing. Cement a 3/8 in. diameter plywood disc over each location for the rear mounting holes. Drill the four mounting holes and also the hole for the bellcrank. Cut away the leading edge as shown. Scoop out where necessary for the bellcrank movement.

For the tail surfaces use hard 1/8 in. sheet. For the rudder, cement two pieces edge to edge with the grain running parallel to the trailing edge. Leave extra wood at the bottom of the rudder so that it may be cemented into the fuselage slot.

Sand to streamlined shape keeping the leading edges rounded and the trailing edges thin and sharp. Hinge the elevators to the stabilizer using your favorite method, or the tube and hinge pin method as shown on the plans. Each tube should be roughened, cemented firmly in place, and covered with silk pieces. Two small plywood discs should be cemented on the bottom of the stabilizer and the mounting holes drilled through them.

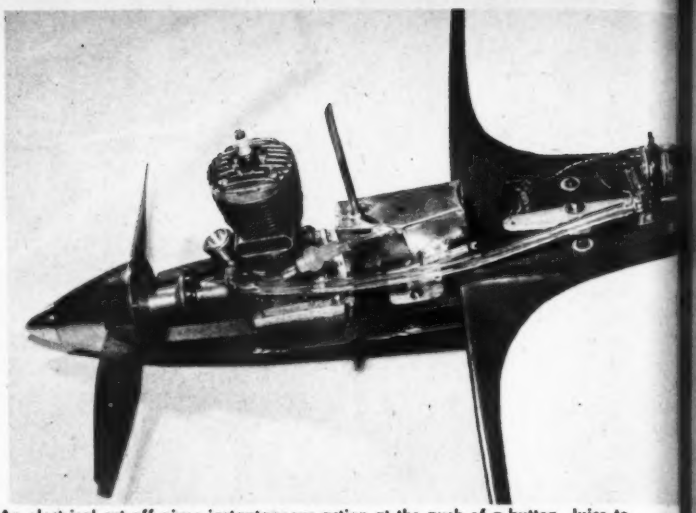
Make the landing gear halves from .051 in. 24ST aluminum. Drill the holes and cut to outline shape. File the leading edges round and the trailing edges sharp. Dress down with fine emery cloth until smooth. The gears may be primed and painted or buffed to a chrome-like finish. Bend the gears as shown on the plans, one right and the other left.

Semi-pneumatic tires with ribbed treads will assist greatly in preventing your racer from "walking" in the stooges, especially after the area becomes fuel-soaked. Mount the wheels to the gears using flat head 6-32 machine screws countersunk into the hubs. The tail skid is formed from 1/16 in. music wire and wrapped with fine wire where it joins. Solder securely.

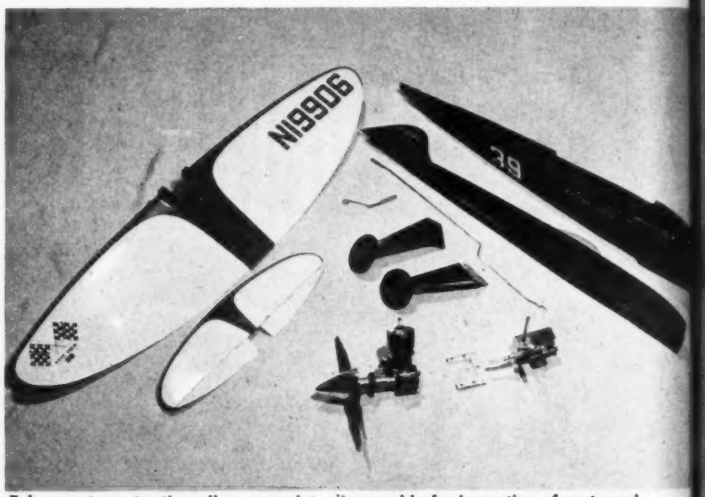
If you are using a K & B .29 engine, you will need a 3/16 in. thick spacer to keep the prop shaft on the center line of the fuselage. Make this of either magnesium or aluminum. Drill to fit the crankcase mounting holes, and tap the hole for the front anchor screw. If an engine with "on center" lugs is used, the spacer is not needed. In this case use a bicycle spoke and nipple (as common in speed models) for the front anchor screw.

The extension spool is a stock McCoy .29 part, as is the prop nut. The spinner can be specially turned for the model or a Froom 1-3/4 in. spinner can be cut down to the required 1-5/8 in. diameter.

The basic fuselage blocks are perfectly round and shaped to NACA 0009 airfoil plot. Select two medium hard balsa blocks 1-1/4 x 2-1/2 x 26 in. Tack cement these together. If a lathe is not available for turning the blocks, they may be easily shaped by hand. First, make cardboard templates for each 2 in. station along the fuselage. In all cases these templates are true circles, hence they can be cut easily by using a small piece of razor blade clamped in a drafting compass pen. Carve the fuselage to rough shape, then slide the templates on and mark the high spots. A soft pencil rubbed around the inside of the templates will mark the spots very easily. Just keep sanding until (*Continued on page* 46)

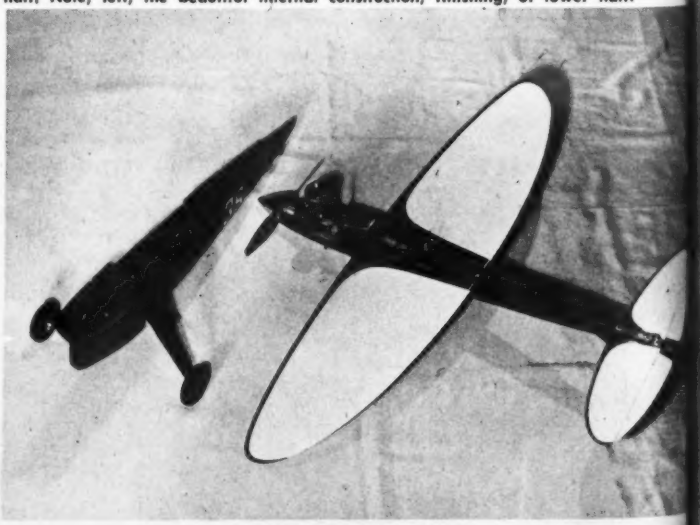


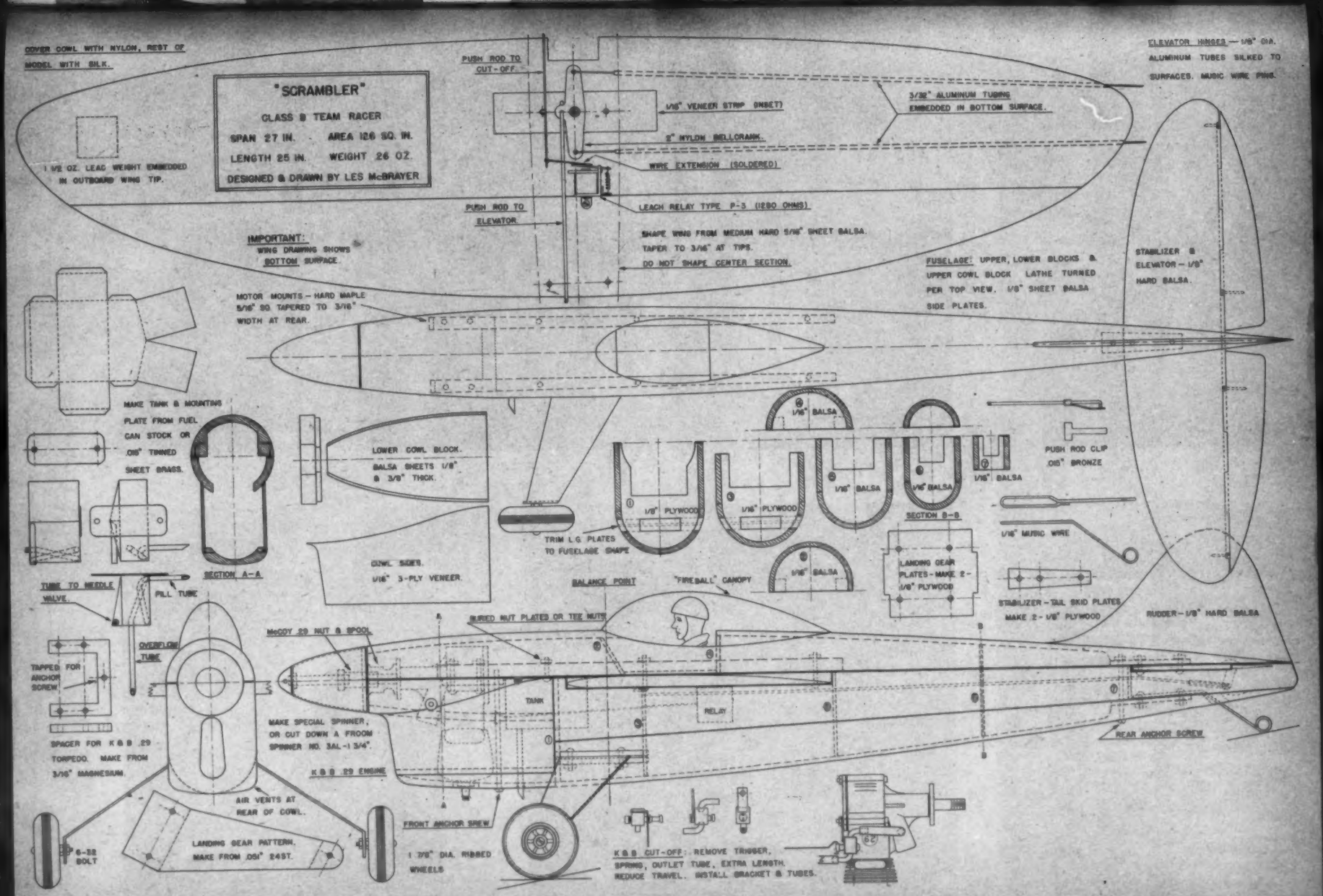
An electrical cut-off gives instantaneous action at the push of a button. Juice to relay goes through two-line control system. Modified K & B Shur Stop for fuel.



Take-apart construction allows complete disassembly for inspection of parts and repairs. Experimentation with different wings, landing gears, tails, made easy.

Engine, tank, wing, tail, cut-off attach to top half; landing gear to the bottom half. Note, left, the beautiful internal construction, finishing, of lower half.



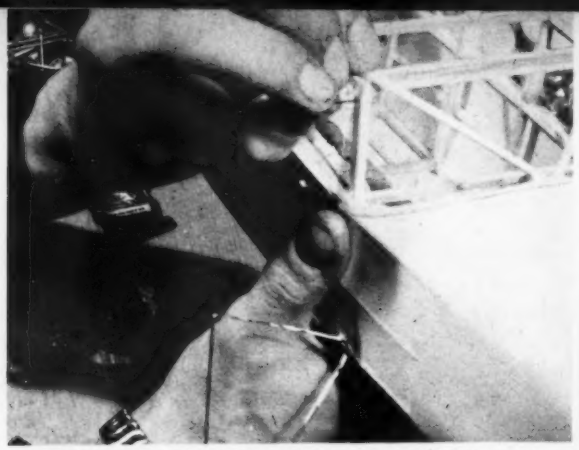

"SCRAMBLER"
CLASS B TEAM RACER
SPAN 27 IN. AREA 126 SQ. IN.
LENGTH 25 IN. WEIGHT 26 OZ.
DESIGNED & DRAWN BY LES McBRAYER
COVER COWL WITH NYLON, REST OF MODEL WITH SILK.
1 1/2 OZ. LEAD WEIGHT EMBEDDED IN OUTBOARD WING TIP.
PUSH ROD TO CUT-OFF
1/16" VENEER STRIP ONSET)
3/32" ALUMINUM TUBING EMBEDDED IN BOTTOM SURFACE.
2" NYLON BELLCRANK.
WIRE EXTENSION (SOLDERED)
PUSH ROD TO ELEVATOR
LEACH RELAY TYPE P-3 (1280 OHMS)
IMPORTANT: WING DRAWING SHOWS BOTTOM SURFACE.
SHAPE WING FROM MEDIUM HARD 5/16" SHEET BALSA. TAPER TO 3/16" AT TIPS. DO NOT SHAPE CENTER SECTION.
ELEVATOR HINGES — 1/8" DIA. ALUMINUM TUBES SILKED TO SURFACES. MUSIC WIRE PINS.
FUSELAGE: UPPER, LOWER BLOCKS & UPPER COWL BLOCK LATHE TURNED PER TOP VIEW. 1/8" SHEET BALSA SIDE PLATES.
STABILIZER & ELEVATOR — 1/8" HARD BALSA.
MOTOR MOUNTS — HARD MAPLE 5/16" SQ. TAPERED TO 3/16" WIDTH AT REAR.
MAKE TANK & MOUNTING PLATE FROM FUEL CAN STOCK OR .015" TINNED SHEET BRASS.
LOWER COWL BLOCK. BALSA SHEETS 1/8" & 3/8" THICK.
COWL SIDES. 1/16" 3-PLY VENEER.
SECTION A-A
TRIM L.G. PLATES TO FUSELAGE SHAPE
1/8" BALSA
1/8" PLYWOOD
1/16" PLYWOOD
1/16" BALSA
SECTION B-B
PUSH ROD CLIP .015" BRONZE
1/16" MUSIC WIRE
LANDING GEAR PLATES - MAKE 2 - 1/8" PLYWOOD
STABILIZER - TAIL SKID PLATES MAKE 2 - 1/8" PLYWOOD
RUDDER - 1/8" HARD BALSA
TUBE TO NEEDLE VALVE
FILL TUBE
OVERFLOW TUBE
TAPPED FOR ANCHOR SCREW
SPACER FOR K & B .29 TORPEDO. MAKE FROM 3/16" MAGNESIUM.
BALANCE POINT
"FIREBALL" CANOPY
BURIED NUT PLATES OR TEE NUTS
McCOY 29 NUT & SPOOL
MAKE SPECIAL SPINNER, OR CUT DOWN A FROOM SPINNER NO. 3AL-1 3/4".
TANK
RELAY
REAR ANCHOR SCREW
K & B 29 ENGINE
AIR VENTS AT REAR OF COWL.
LANDING GEAR PATTERN, MAKE FROM .051" 24ST.
6-32 BOLT
FRONT ANCHOR SREW
1 7/8" DIA. RIBBED WHEELS
K & B CUT-OFF: REMOVE TRIGGER, SPRING, OUTLET TUBE, EXTRA LENGTH. REDUCE TRAVEL. INSTALL BRACKET & TUBES.

FULL SIZE PLANS AVAILABLE. SEE PAGE 50.

HOW..to Paint ..and Trim

..By ART SILBERBERG

This set of pictures concludes the four-part series of how-to-do-its based upon the construction of a representative kit, a Berkeley rubber-powered Fairchild. Hundreds of photos like these would be needed comprehensively to outline the art of building model planes. For example, our model somehow was magically painted between issues, perhaps by little elves. But these pictures included many of the more important high points and, it is hoped, may have instilled a "feel" for neat building among younger readers. Previous installments embraced making of built-up fuselage, wings and tails, and also covering.



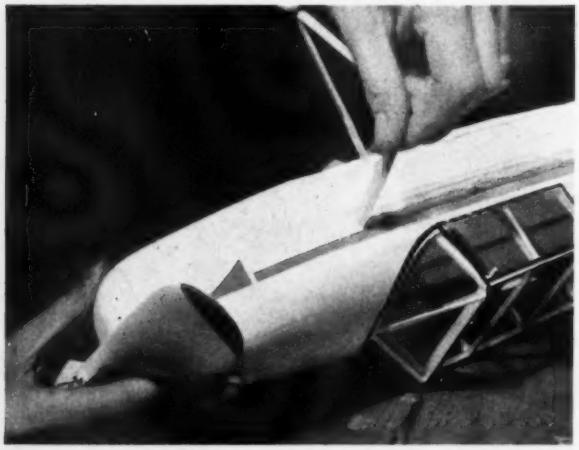
Cement top of windshield, center bottom, let dry; bend around, cement, hold with pins. Bead-cement front, lower edge. Use tube.

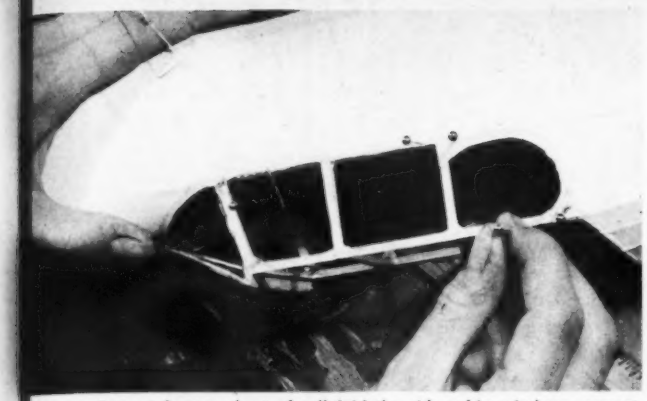
Making outside curves with tape done by stretching one side, bunching other. Don't worry about mistakes because tape lifts off. Re-use.

If Trim Film is not available, a similar effect is achieved by painting over Scotch tape which has been laid out in a straight line.

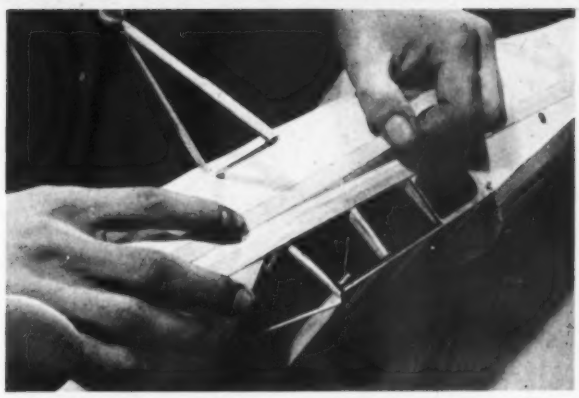
Place the colored Scotch tape in place to outline doors, controls, etc., then place razor blade on spot to be cut, lift tape. Cuts itself.

Best way to remove tape is to lift it vertically from the surface it was stuck to. Trim must be thoroughly dry or it may lift with tape.



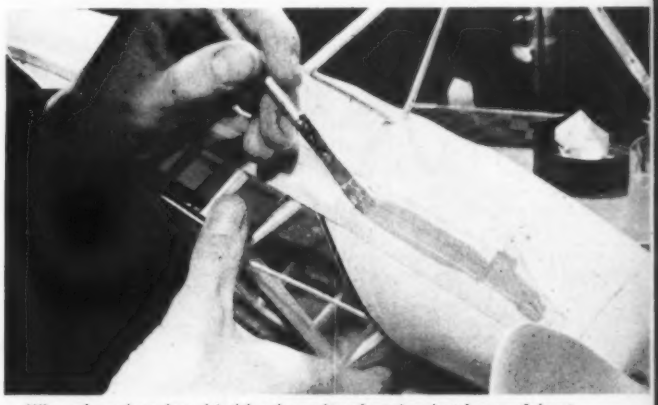


Cut out from a sheet of celluloid the side cabin windows, cement, and pin in place. Avoid excess cement because smearing could result.



Masking tape is used to get sharp lines when trimmed with the colored dope. Stretch tape firmly, press down, rub in place with finger.

Brush area to be colored with clear dope to make sure of seal between tape and covering. Prevents "bleeding" of color under the tape.

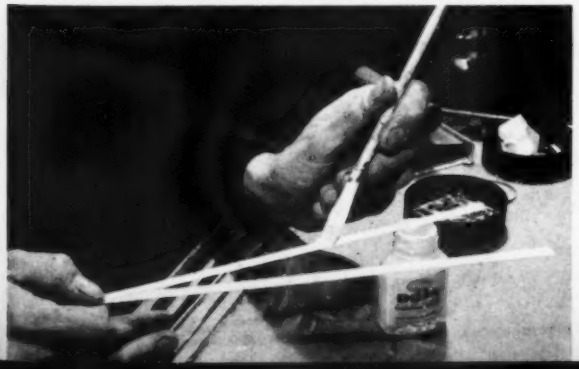


When clear dope has dried hard, apply color trim. Just be careful not to brush beyond tape area. Various designs are possible with tape.

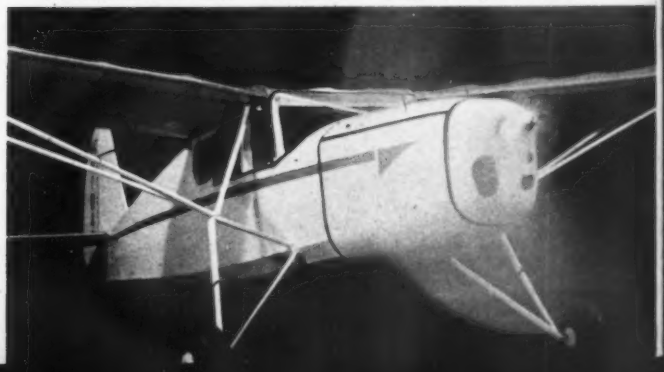
Using a sharp model knife or straight edged razor blade, and a ruler for a guide, cut out strips of doped tape about 1/16 in. in width.

When dry, lift the end of the trim strip with razor blade and pull the strip up from the work area. Widths varied for different purposes.

Paint all small parts and struts separately from airplane; cement in place when dry. Painting around such joints makes for sloppy work.



Worth it? You bet your boots! As a rule, the best built models are the finest performers. Good workmanship is a sign of right attitude.



MAYBE

by PETE HARTZELL

Scaled-up conversion of Willard's Drake to land-plane for sport flying proves beautiful, realistic flier with ability to perform well in high winds.

Year 'round ability of ship is suggested by author's turned up collar and snow in background. Still larger version of this airplane is good RC.

Trike gear insures arrow-straight take-offs. Cemented-on tail won't knock off through high position. Engine above wing really saves propellers.

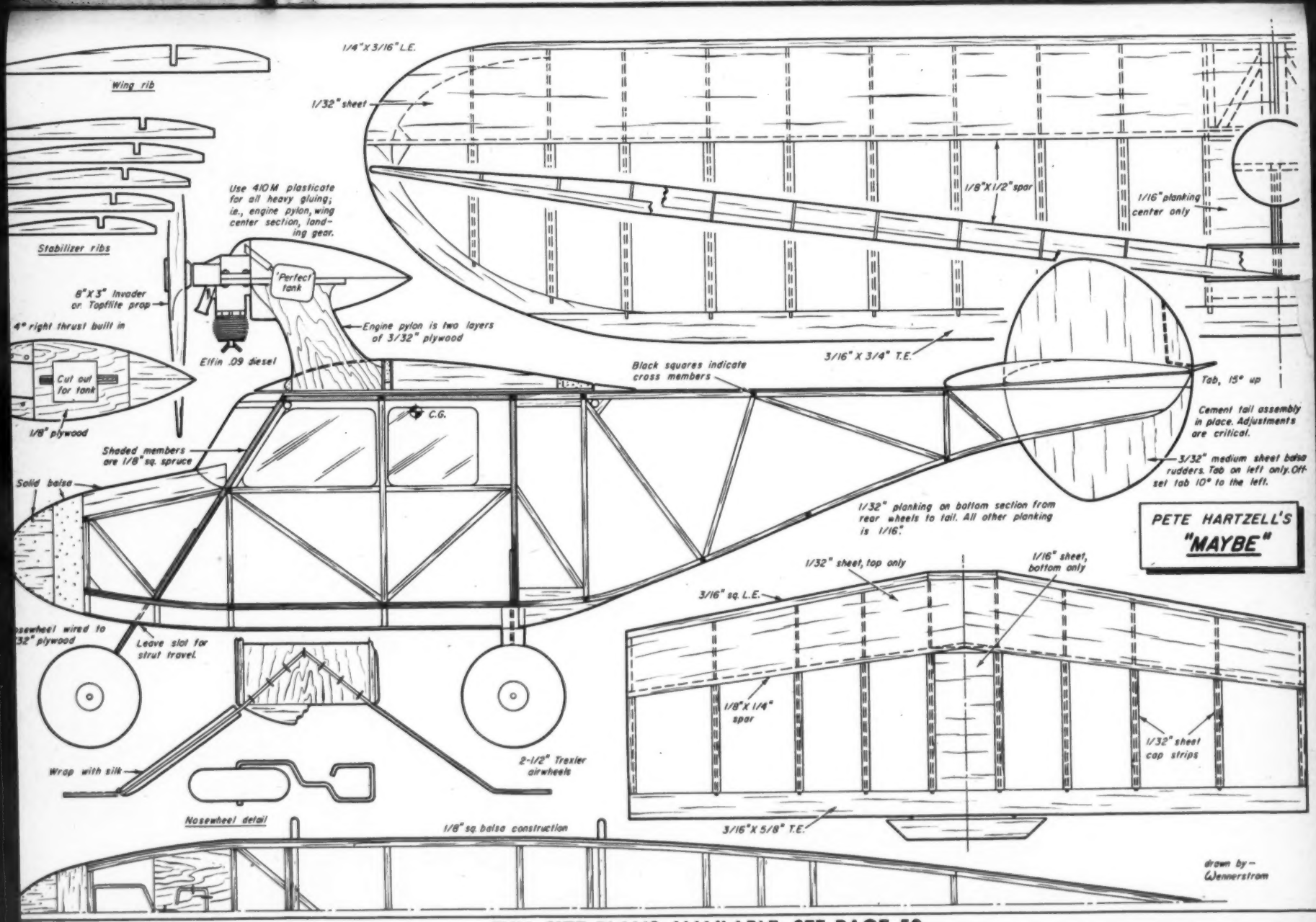
▸ This design is a scaled-up conversion of Ken Willard's Drake flying boat in the November, 1951, issue, intended for sport model use with an .09 Diesel. Since there were none available at the time the design was projected, it was decided to gather ideas on the drawing board. As there are several inherent factors of the Drake that had to be included in this model, you may get the impression that it is a dry land Drake, and rightly so; however, it needed more than that to put this heavier and higher powered Diesel model over as a successful flier.

Bear in mind that while some of the construction may seem unorthodox, over 100 ROG take-offs and landings on concrete prove that this model can take it. Transition from power to glide is made without a change in altitude. As to wind, this model can be flown when others cannot; and has, on occasion, been retrieved upwind, its weather vane stability being slightly terrific. In calm weather, it is like flying controlline with 200 ft. lines. So get on the ball, fellow balsa dusters, and see what you can do!

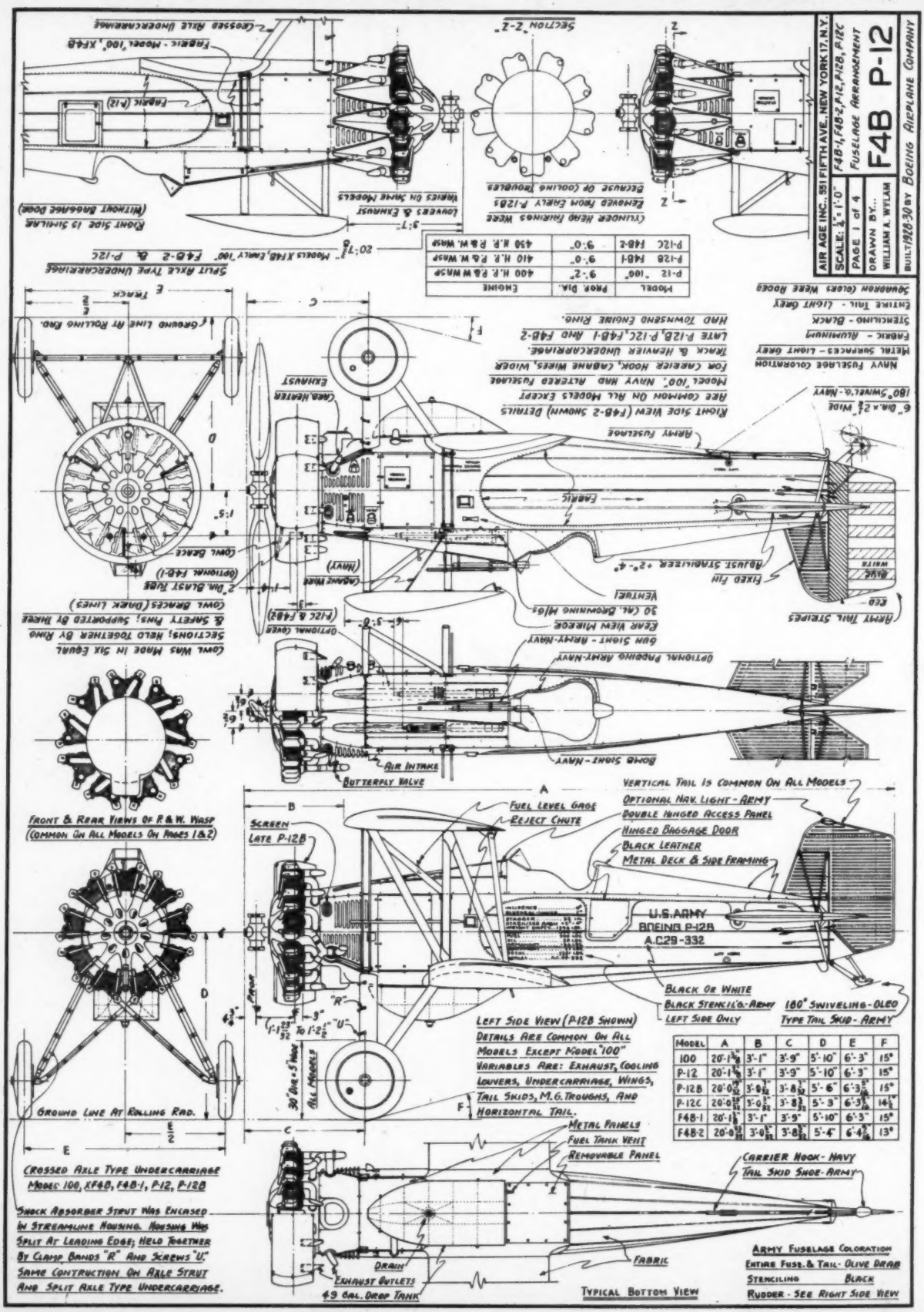
A few things should be pointed out in the construction of this model. The sides of the fuselage are made by first cutting suitable 1/16 in. sheet balsa to shape, cutting out the window openings, and then marking off the locations of the cross members. This is faster and more accurate than the reverse order. 410M cement was used with hard wood as most strain is encountered here.

Begin assembly of the fuselage by installing the cross members, starting from the cabin and working back. Then, very carefully bend the front section to meet the set position of cross members and wrap with Scotch tape to hold this position until the cement dries. Use the cut-and-try method to get the shape of the plywood (*Continued on page* 52)

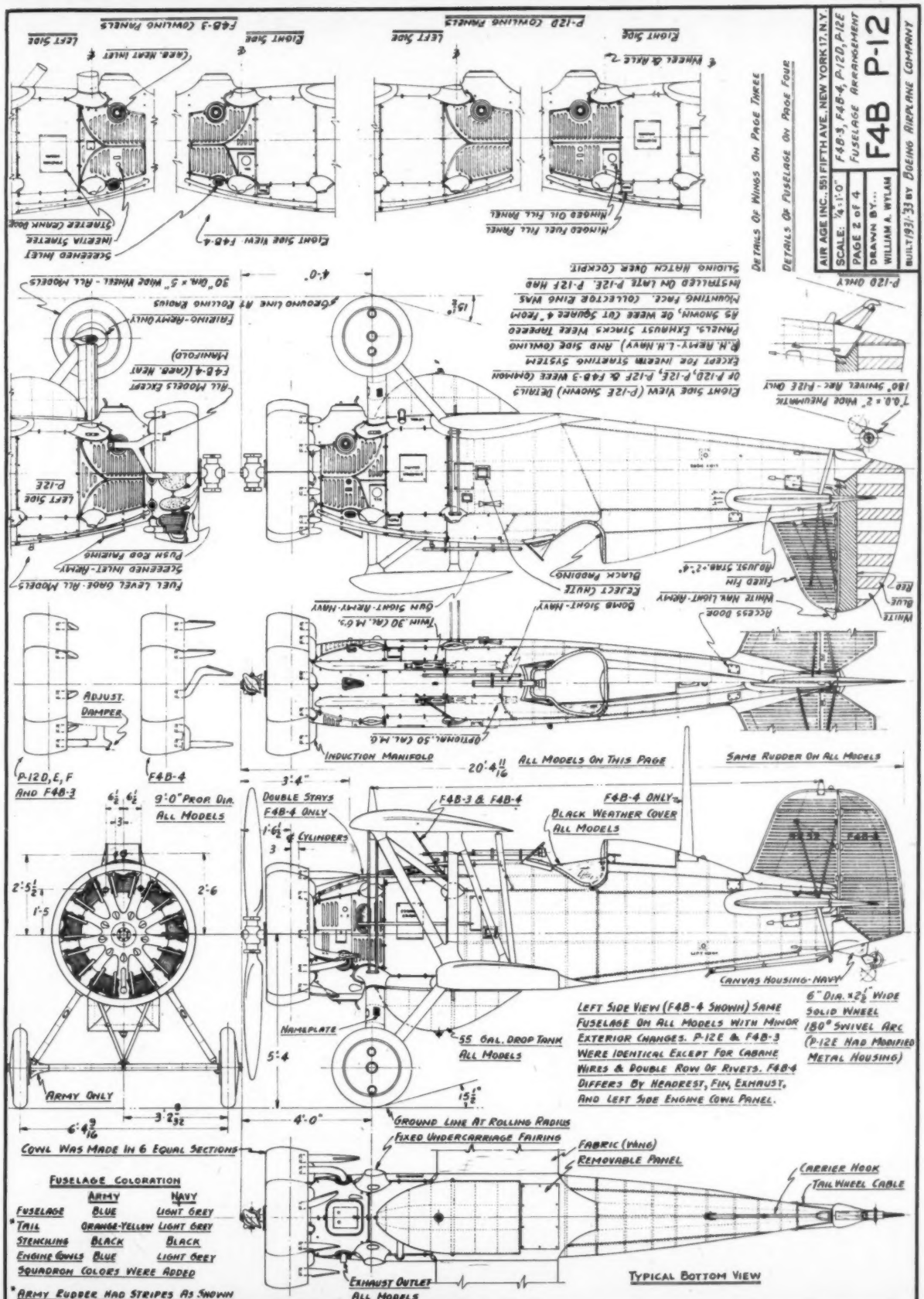
Except for engine above wing, Maybe resembles old Skyfarer safety light plane. Wing, with engine, is knock-off, straps on with rubber. Takes .09 engines


1/4"X3/16" L.E.
Wing rib
1/32" sheet
1/8"X1/2" spar
1/16" planking center only
Use 410M plasticate for all heavy gluing; ie., engine pylon, wing center section, landing gear.
Stabilizer ribs
Perfect tank
6"X3" Invader on Topflite prop
4° right thrust built in
Engine pylon is two layers of 3/32" plywood
Elfin .09 diesel
3/16" X 3/4" T.E.
Black squares indicate cross members
Tab, 15° up
Cut out for tank
1/8" plywood
C.G.
Cement tail assembly in place. Adjustments are critical.
Shaded members are 1/8" sq. spruce
3/32" medium sheet balsa rudders. Tab on left only. Offset tab 10° to the left.
Solid balsa
1/32" planking on bottom section from rear wheels to tail. All other planking is 1/16".
PETE HARTZELL'S "MAYBE"
1/32" sheet, top only
1/16" sheet, bottom only
3/16" sq. L.E.
sewheel wired to 32" plywood
Leave slot for strut travel.
1/8"X1/4" spar
1/32" sheet cap strips
Wrap with silk
2-1/2" Trexler airwheels
Nosewheel detail
1/8" sq. balsa construction
3/16"X5/8" T.E.
drawn by – Wennerstrom

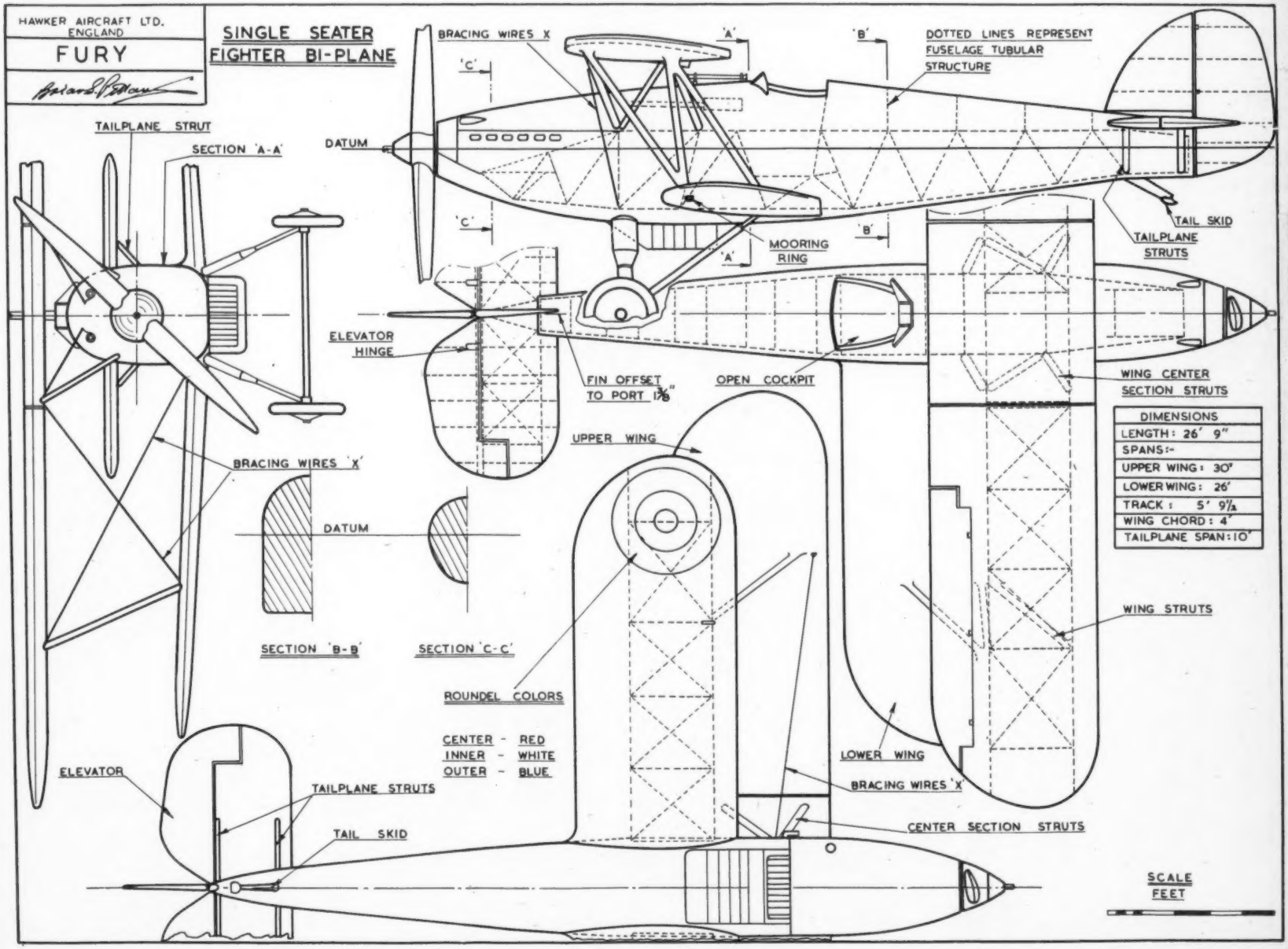
FULL SIZE PLANS AVAILABLE. SEE PAGE 50.

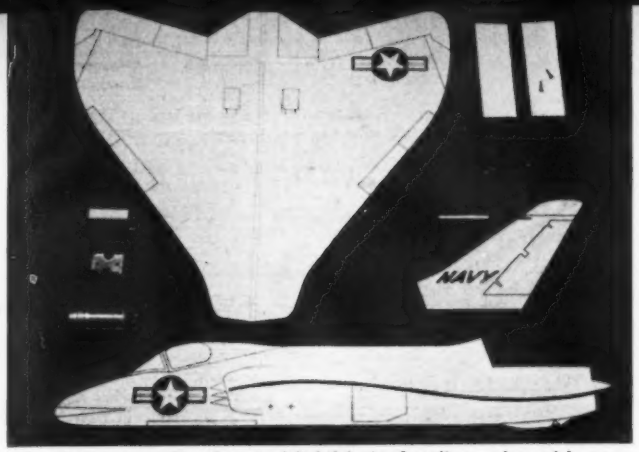

AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.
SCALE: 1/4" = 1'-0"
PAGE 1 of 4
DRAWN BY... WILLIAM A. WYLAM
F4B-1, F4B-2, P-12, P-12B, P-12C
FUSELAGE ARRANGEMENT
F4B P-12
BUILT 1928-30 BY BOEING AIRPLANE COMPANY
Part 1—Page 1 of 4
SECTION "Z-Z"
Z
Z
CROSSED AXLE UNDERCARRIAGE
FABRIC - MODEL "100", XF4B
FABRIC (P-12)
LOUVERS & EXHAUST VENTS ON SOME MODELS
RIGHT SIDE IS SIMILAR (WITHOUT BAGGAGE DOOR)
20'-7 3/8"
MODELS XF4B, EARLY "100" F4B-2 & P-12C
SPLIT AXLE TYPE UNDERCARRIAGE
TRACK
GROUND LINE AT ROLLING RAD.
EXHAUST
CARB. HEATER
RIGHT SIDE VIEW (F4B-2 SHOWN) DETAILS ARE COMMON ON ALL MODELS EXCEPT MODEL "100". NAVY AND ALTERED FUSELAGE FOR CREEPER HOOK, (GRANE WIRES, WIDER TRACK & HENAVIER UNDERCARRIAGE. LATE P-12B, P-12C, F4B-1 AND F4B-2 HAD TOWNSEND ENGINE RING.
NAVY FUSELAGE COLORATION
METAL SURFACES - LIGHT GREY
FABRIC - ALUMINUM
STENCILING - BLACK
ENTIRE TAIL - LIGHT GREY
SQUADRON COLORS WERE RODED
ENGINE
MODEL | PROP. DIA. | ENGINE
P-12 "100" | 9'-2" | 450 H.P. P.&W. WASP
P-12B F4B-1 | 9'-0" | 410 H.P. P.&W. WASP
P-12C F4B-2 | 9'-0" | 450 H.P. P.&W. WASP
ARMY FUSELAGE
FIXED FIN
ADJUST. STABILIZER +2°-4°
FABRIC
ARMY TAIL STRIPES
6" DIA. x 2 1/2" WIDE 180° SWIVEL-O.-NAVY
OPTIONAL TAIL SKID (LATE F4B-2)
2" DIA. BLAST RIDE (OPTIONAL F4B-1)
TOWL BRACE
GUN SIGHT - ARMY-NAVY
REAR VIEW MIRROR
30 CAL. BROWNING M/GS.
VENTRAL
OPTIONAL PIGEON ARMY-NAVY
BOMB SIGHT - NAVY
AIR INTAKE
BUTTERFLY VALVE
OPTIONAL CREEP (P12C & F4B2)
TOWL WAS MADE IN SIX EQUAL SECTIONS; HELD TOGETHER BY RING & SAFETY PINS; SUPPORTED BY THREE TOWL BRACES (DARK LINES)
FRONT & REAR VIEWS OF P. & W. WASP (COMMON ON ALL MODELS ON PAGES 1 & 2)
GROUND LINE AT ROLLING RAD.
CROSSED AXLE TYPE UNDERCARRIAGE MODELS 100, XF4B, F4B-1, P-12, P-12B
SHOCK ABSORBER STRUT WAS ENCASED IN STREAMLINE HOUSING. HOUSING WAS SPLIT AT LEADING EDGE; HELD TOGETHER BY CLASP BANDS "R" AND SCREWS "U". SAME CONTRUCTION ON AXLE STRUT AND SPLIT AXLE TYPE UNDERCARRIAGE.
SCREEN LATE P-12B
FUEL LEVEL GAGE
REJECT CHUTE
DOUBLE HINGED ACCESS PANEL
HINGED BAGGAGE DOOR
BLACK LEATHER
METAL DECK & SIDE FRAMING
VERTICAL TAIL IS COMMON ON ALL MODELS
OPTIONAL NAV. LIGHT - ARMY
U.S. ARMY
BOEING P-12B
A.C.29-332
BLACK OR WHITE
BLACK STENCIL'G. - ARMY
LEFT SIDE ONLY
180° SWIVELING - OLEO TYPE TAIL SKID - ARMY
LEFT SIDE VIEW (P-12B SHOWN)
DETAILS ARE COMMON ON ALL MODELS EXCEPT MODEL "100"
VARIABLES ARE: EXHAUST, COOLING LOUVERS, UNDERCARRIAGE, WINGS, TAIL SKIDS, M.G. TROUGHS, AND HORIZONTAL TAIL.
METAL PANELS
FUEL TANK VENT
REMOVABLE PANEL
CARRIER HOOK - NAVY
TAIL SKID SHOE - ARMY
DRAIN
EXHAUST OUTLETS
49 GAL. DROP TANK
FABRIC
TYPICAL BOTTOM VIEW
ARMY FUSELAGE COLORATION
ENTIRE FUSE. & TAIL - OLIVE DRAB
STENCILING - BLACK
RUDDER - SEE RIGHT SIDE VIEW

MODEL	A	B	C	D	E	F
100	20'-1 3/4"	3'-1"	3'-9"	5'-10"	6'-3"	15°
P-12	20'-1 3/4"	3'-1"	3'-9"	5'-10"	6'-3"	15°
P-12B	20'-0 3/32"	3'-0 3/32"	3'-8 3/32"	5'-6"	6'-3"	15°
P-12C	20'-0 3/32"	3'-0 3/32"	3'-8 3/32"	5'-3"	6'-3"	14 1/2°
F4B-1	20'-1 3/4"	3'-1"	3'-9"	5'-10"	6'-3"	15°
F4B-2	20'-0 3/32"	3'-0 3/32"	3'-8 3/32"	5'-4"	6'-4 3/32"	13°


AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.
SCALE: 1/4"=1'-0"
PAGE 2 of 4
DRAWN BY... WILLIAM A. WYLAM
F4B-3, F4B-4, P-12D, P-12E
FUSELAGE ARRANGEMENT
F4B P-12
BUILT 1931-'33 BY BOEING AIRPLANE COMPANY
DETAILS OF WINGS ON PAGE THREE
DETAILS OF FUSELAGE ON PAGE FOUR
P-12D ONLY
RIGHT SIDE
LEFT SIDE
P-12D COWLING PANELS
F4B-3 COWLING PANELS
WHEEL & AXLE
MINGED FUEL FILL PANEL
MINGED OIL FILL PANEL
(AFT. HEAT INLET)
STEERING INLET
INERTIA STARTER
STARTER CRANK HOLE
RIGHT SIDE VIEW F4B-4
RIGHT SIDE VIEW (P-12E SHOWN) DETAILS OF P-12D, P-12E, P-12F & F4B-3 WEEE (CANON EXCEPT FOR INERTIA STARTING SYSTEM (R.H. REMY-L.H. NAVY) AND SIDE COWLING PANELS, EXHAUST STACKS WERE TAPERED AS SHOWN, OR WERE CUT SQUARE 4" FROM MOUNTING FACE. COLLECTOR RING WAS INSTALLED ON LATE P-12E. P-12F AND F4B-4 SLIDING HATCH OVER COCKPIT
4'-0"
30" DIA. x 5" WIDE WHEEL - ALL MODELS
GROUND LINE AND ROLLING RADIUS
15 1/2"
FAIRING-ARMY ONLY
ALL MODELS EXCEPT F4B-4 (AFT. HEAT MANIFOLD)
LEFT SIDE P-12E
PUSH FOR PRIMING
STEERING INLET-ARMY
FUEL LEVEL GAGE-ALL MODELS
T.D. x 2" WIDE PNEUMATIC
180° SWIVEL ARC - P-12E ONLY
ACCESS DOOR
WHITE
BLUE
RED
WHITE NAV. LIGHT-ARMY
TILTED FIN ADJUST. STAB. 2°-4°
EJECT CHUTE
BLACK PAINTING
BOMB SIGHT-NAVY
TWIN .30 CAL. M.G.
GUN SIGHT-ARMY-NAVY
OPTIONAL .50 CAL. M.G.
INDUCTION MANIFOLD
ADJUST. DAMPER
P-12D, E, F AND F4B-3
F4B-4
20'-4 11/16"
ALL MODELS ON THIS PAGE
SAME RUDDER ON ALL MODELS
3'-4"
DOUBLE STAYS F4B-4 ONLY
F4B-3 & F4B-4
F4B-4 ONLY BLACK WEATHER COVER ALL MODELS
9'-0" PROP. DIA. ALL MODELS
6 1/2, 6 1/2
3"
1'-6 1/2"
9 CYLINDERS
3
2'-5 1/2"
1'-5
2'-6
F4B-3
F4B-4
CANVAS HOUSING-NAVY
6" DIA. x 2 1/2" WIDE SOLID WHEEL 180° SWIVEL ARC (P-12E HAD MODIFIED METAL HOUSING)
NAME PLATE
55 GAL. DROP TANK ALL MODELS
LEFT SIDE VIEW (F4B-4 SHOWN) SAME FUSELAGE ON ALL MODELS WITH MINOR EXTERIOR CHANGES. P-12E & F4B-3 WERE IDENTICAL EXCEPT FOR CABANE WIRES & DOUBLE ROW OF RIVETS. F4B-4 DIFFERS BY HEADREST, FIN, EXHAUST, AND LEFT SIDE ENGINE COWL PANEL.
5'-4"
ARMY ONLY
3'-2 25/32"
6'-4 3/16"
4'-0"
GROUND LINE AT ROLLING RADIUS
COWL WAS MADE IN 6 EQUAL SECTIONS
FIXED UNDERCARRIAGE FAIRING
FABRIC (WING)
REMOVABLE PANEL
CARRIER HOOK
TAIL WHEEL CABLE
EXHAUST OUTLET ALL MODELS
TYPICAL BOTTOM VIEW
FUSELAGE COLORATION
ARMY NAVY
FUSELAGE BLUE LIGHT GREY
*TAIL ORANGE-YELLOW LIGHT GREY
STENCILING BLACK BLACK
ENGINE COWLS BLUE LIGHT GREY
SQUADRON COLORS WERE ADDED
*ARMY RUDDER HAD STRIPES AS SHOWN

Planes Worth Modeling— HAWKER FURY





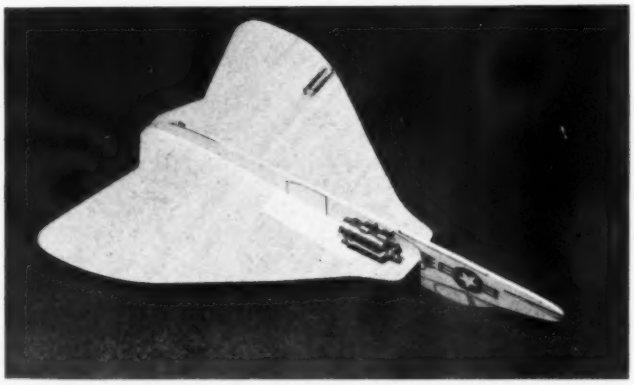
Although only a profile, there is delightful air of realism, enhanced by some careful detailing of the control outlines, insignia, and so on, with a soft pencil.

Novel S-shaped airfoil section has proved best for this type of ship. Sheet wing slides into slot in fuselage and assumes proper shape.

SKYRAY

By BILL DEAN

This profile bat wing really gets moving on its Jetex .50 powerplant. The accompanying plans are full size. Two hours' working time but many hours of fun flying.



Underneath view showing off-center mounting of Jetex and its asbestos strip. The paper clip counterweight to the motor indicates the size of the finished model.

Pretty in flight is the tiny Skyray here held as for launching by Val Mason. Odd fact about deltas is their stability without dihedral. Sweepback has same effect.

Soon after the existing world air speed record of 753.4 mph was notched up by the famed Douglas F4D Skyray, we decided to make a simple all-sheet replica of this unusual bat-winged aircraft. Chet Miller, Douglas public relations manager, kindly provided three-views, photos and other data on which we were able to base our plans. Previous experience with similar deltas had shown us that no dihedral was needed and an 'S' shaped airfoil was best—and in this case we found that scale fin area was exactly right. The correct balance point was located by shifting the Jetex .50 backward and forward along the fuselage until a smooth glide resulted.

As luck would have it, the prototype had a natural turn to the right and this effectively canceled out the left-turning tendency under power caused by the side-mounted (on right) power unit. Minor trim adjustments were effected by bending the wing trailing edges and the flight pattern consisted of a steady climb curving slightly to the right, followed by tighter right circles on the glide.

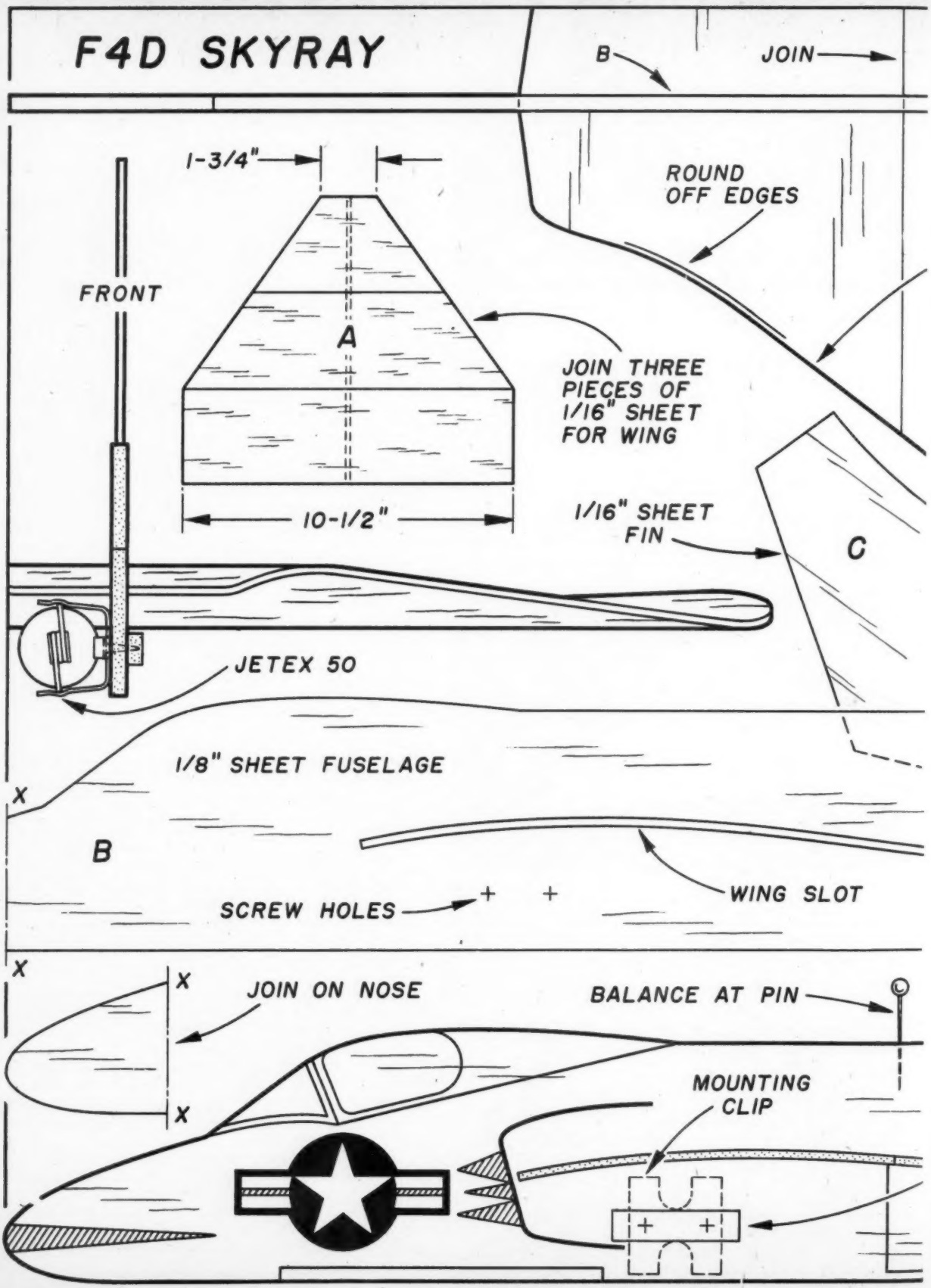
Stability is as good as any conventional design and stall recovery is much, much better. Glide ratio is slightly inferior to the usual wing-and-tailplane type, but the sight of a scale Skyray wheeling gracefully overhead is ample compensation. You might expect this to be a tricky little ship to fly, but in actual fact the F4D proved to be one of those "naturals" for model building, just like a Piper Cub or a Fokker D-8!

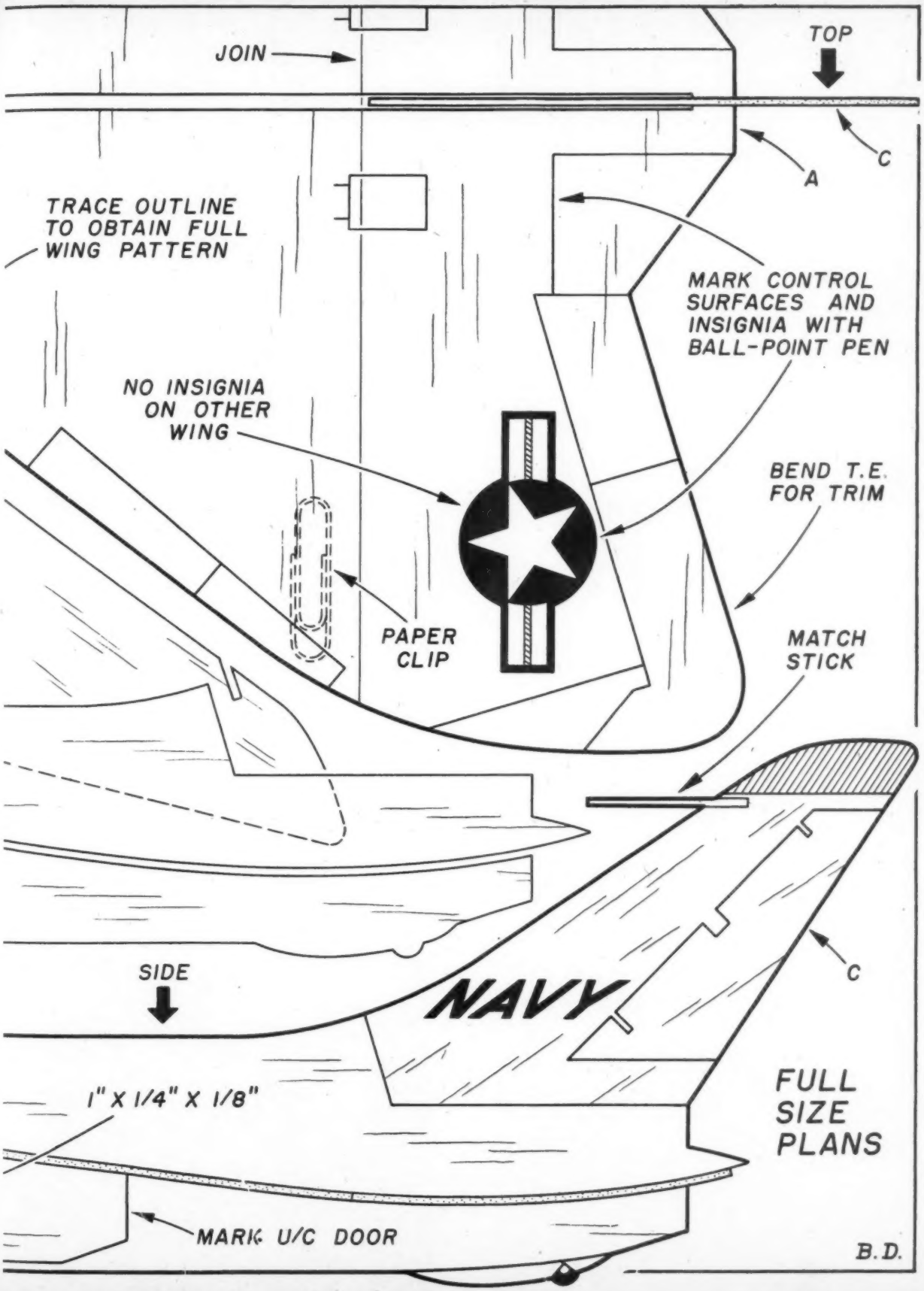
Now let's turn to the construction notes. Start by joining three pieces of medium-soft 1/16 in. sheet (3 in. wide), edge to edge, pinning them down flat on the building board (see dimensioned sketch on left of plan). Trace the actual outline of the wing (A) onto these joined pieces of sheet and cut out.

Trace the fuselage (B) onto medium-hard 1/8 in. sheet and the fin (C) onto medium-soft 1/16 in. sheet, noting the wood grain direction. Cut out these parts, then pierce two holes in the fuselage to take the screws for the Jetex mounting clip and cement a rounded matchstick in the upper fin slot. Now trace the markings—such as the canopy, insignia, U/C doors and control surface outlines—with a soft pencil. Go over the pencil lines with a ball point pen, using a straight edge as a guide where possible.

Mark the fuselage location on the wing with two soft pencil lines (top and bottom), then cement the wing in the 'S' shaped fuselage slot. Make sure the wing squares up with the fuselage in the front view and hold the two parts together with pins until the cement dries. Cement the fin to the fuselage, making (*Continued on page* 51)

PLANS ON FOLLOWING PAGES


F4D SKYRAY
B
JOIN
1-3/4"
ROUND OFF EDGES
FRONT
A
JOIN THREE PIECES OF 1/16" SHEET FOR WING
10-1/2"
1/16" SHEET FIN
C
JETEX 50
1/8" SHEET FUSELAGE
X
B
SCREW HOLES
WING SLOT
X
X
JOIN ON NOSE
X
BALANCE AT PIN
MOUNTING CLIP

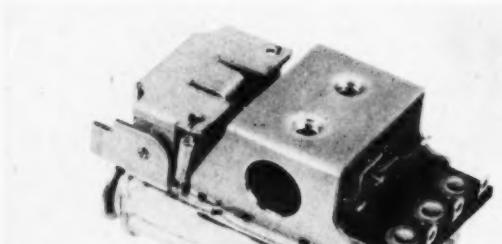

JOIN
TOP
A
C
TRACE OUTLINE TO OBTAIN FULL WING PATTERN
MARK CONTROL SURFACES AND INSIGNIA WITH BALL-POINT PEN
NO INSIGNIA ON OTHER WING
BEND T.E. FOR TRIM
PAPER CLIP
MATCH STICK
SIDE
NAVY
C
1" X 1/4" X 1/8"
FULL SIZE PLANS
MARK U/C DOOR
B.D.

Radio Control NEWS

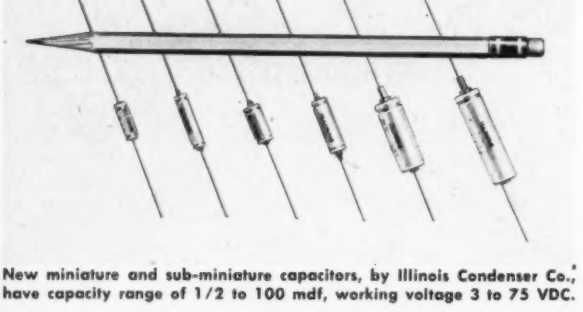
By E. J. LORENZ

An interference-proof escapement leads off the parade of valuable items in this month's coverage. Technical notes, club news, ideas from far and near round out an up-to-the-minute briefing.

Nine-foot Cavalier seems to go on forever. This one, by Frank Mall, was seen at contest, Milwaukee Flying Electrons; houses Rockwood 5-channel.



Sigma's new Model 26F relay, designed especially for radio control modeling, has extraordinary resistance to vibration, is smaller than old 4F.



New miniature and sub-miniature capacitors, by Illinois Condenser Co., have capacity range of 1/2 to 100 mdf, working voltage 3 to 75 VDC.

British Nats, 1954 radio winner, by Sid Allen. Rudder, engine, elevator. On winning flight model was landed, taxied, took off again. ED equipped.

▶ One of the main concerns of the actuator designer (especially escapements) is that of making a so-called "foolproof" unit. By this we mean one which will respond only to your signal. Gil Miles of New South Wales, Australia, sends in the design of an escapement that provides a "safety" position whereby a spurious signal will allow the wheel to go only to that "safety" position. As can be seen in Fig. A, this "safety" position is only a very slight movement toward left or right rudder, much better, you'll agree, than having a single spurious signal give full left or right rudder. To obtain *left,* give one short pulse to get through the "safety" position and then hold a pulse for as long as left rudder is desired. For *right* rudder, give two short pulses to get through "safety" and left and then hold a pulse for as long as right rudder is desired. The actuator will always return to neutral when the signal is removed, whether in the "safety" position or in *left* or *right.* We've built this unit and can vouch for its merit.

This is not a construction article but we will point out the main things to keep in mind when you build it. Refer to Fig. A and Photo 1 when reading the following:

1. The *neutral* pin is the only pin that comes through on the front face of the "slow-down" wheel.
2. The *left, safety* and *right* pins extend *only* on the back side of the wheel.
3. The pawl is shaped as sketched in order to catch *neutral*

What does Ohm's Law mean to you? Nothing? Wonder why escapement batteries run down faster when you increase voltage? Sketch illustrates.

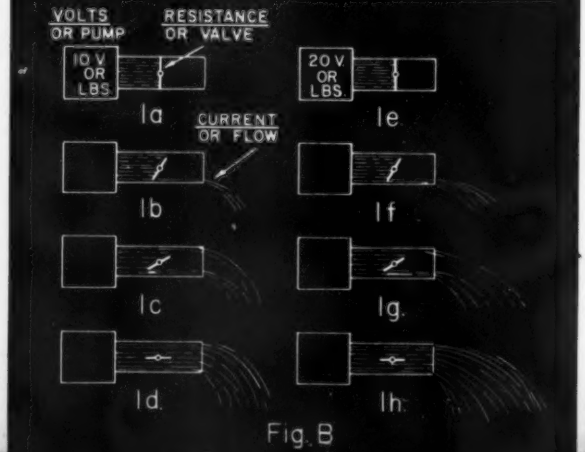
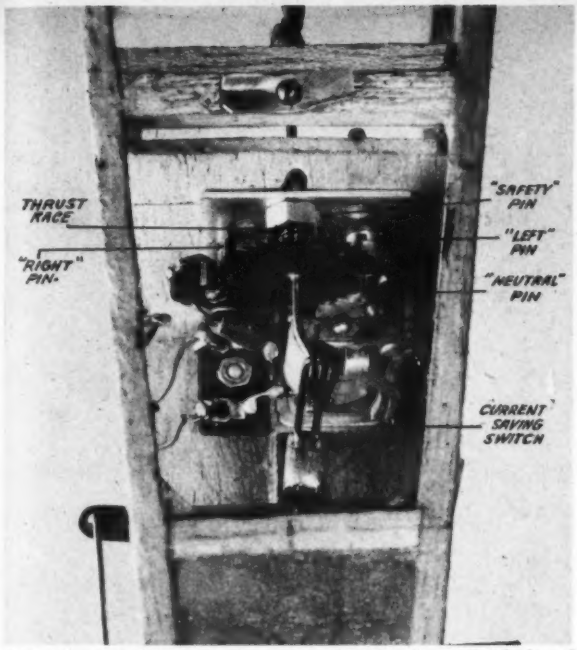
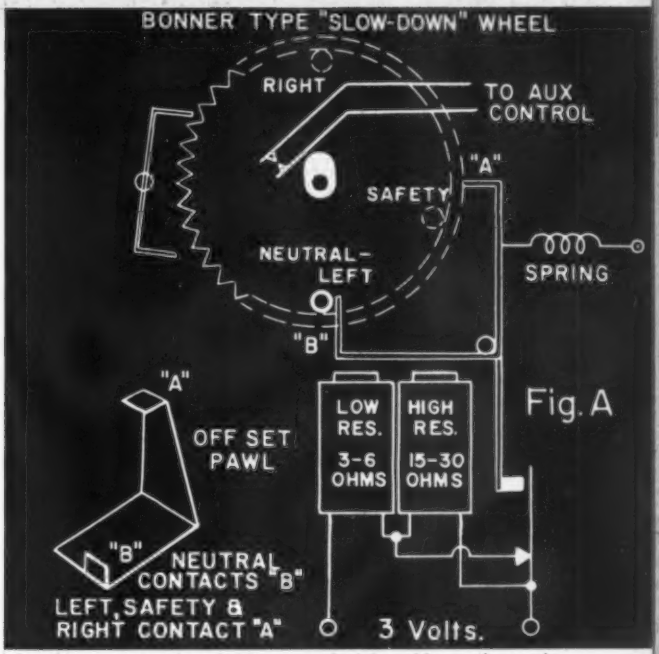


Fig. B



Picture above and drawing, right, show Gil Miles' (Australia) foolproof escapement. An outside, spurious signal cannot cause a spin-in. Gives left rudder on two pulses, holding second; right rudder on three pulses, holding third. Author built unit for checking and vouches for its merit.



as shown in the drawing. The top catch of the pawl will stop *left*, *safety* and *right* whenever the coil is energized.

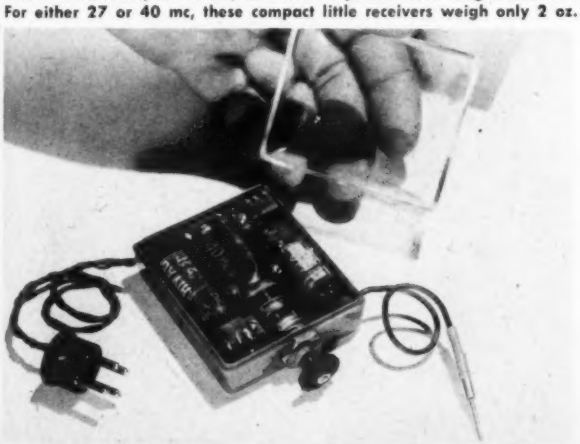
4. If desired, a cam-operated set of contacts may be added to close when in "safety" position. It is suggested that a slight time delay be introduced into this circuit in the form of a delay relay or suitable delay built into the coil of the auxiliary actuating device.

5. The dual coil current saver will allow the coil to draw from 1/2 to 1 amp to pull in the pawl and then hold it at a current drain of about 160 ma down to about 83 ma. For all practical purposes it is suggested that the low resistance coil be 5 ohms and the high resistance coil about 20 ohms. On 3 volts this will give a current drain of 120 ma. A magnetic return coil piece should be used on the *low* resistance coil, similar to that on most relays and escapements. Incidentally, we have a dual coil escapement which has been in use about 3-1/2 years and which has a hold on current drain of 80 ma. One set of "C" cells lasts about a year and a half. Jack Port's '53 Nationals winner used a copy of this escapement.

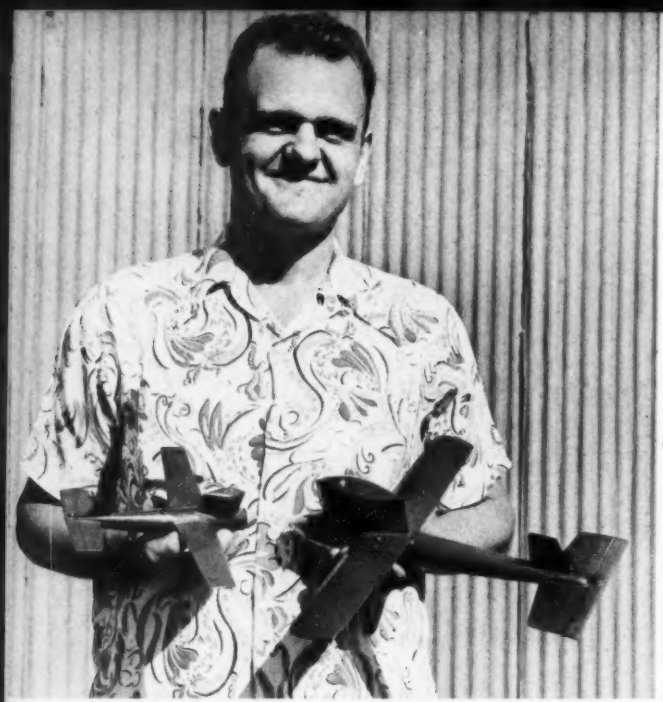
Many newcomers to RC work, both clubs and individuals, have requested information to help them better understand radio and electrical theory. Of course, there are many text books that can be studied, but we know how hard it is to grasp the basic theory of an unfamiliar subject, if it is not presented in its simplest form. In view of this, we have taken Ohm's Law, the basis for all electrical work, and with pictures and analogies shall try to present it clearly and comprehensively. Ohm s Law, which deals with voltage, current and resistance, is stated as follows: "The current in a circuit equals the voltage in that circuit divided by the resistance of the circuit." Or, in other words, the ohm is a resistance across which there is a potential drop of one volt when the current in it is one ampere.

Basically, we can figure out what the current in a component or conductor will be, if we know the voltage and resistance. Or we can determine how much voltage is needed to produce a certain current when the resistance of the circuit is known. Likewise, if the voltage and current are known, we can determine the resistance of the circuit. The formula for each of these will be given later. Remember that a clear understanding of Ohm's Law will help, not only in designing the radio or electronic end of your set, but in calculating for various actuators and other electrical devices. The following explanation will deal only with DC voltages. Instead of trying to memorize Ohm's Law and thus (*Continued on page* 42)

Below—Two-tuber, Gil Miles, mounted in plastic case. Slug tuned coil. For either 27 or 40 mc, these compact little receivers weigh only 2 oz.



Tony Farnan, Melbourne, Australia, who sends this pic of local RC group, says they haven't reached inverted flight, just push button. Few have!



Smiling Arnold Nelson, Hell's Angels of Napa club, just broke WAM speed records, 87.68 Half-A, 134.77, B, when Pop Robbers clicked shutter.

Leland Martin from Dallas, Tex., and his McCoy .60 glow-powered plane which set official AMA record of 160.51 in Class C competition.

WHAT'S NEW IN SPEED?

Because experts jealously guard "trade secrets," the average modeler has a tough time when he competes in speed. This expert lays it on the line. The second of two valuable installments.

by LEO R. HOLLIDAY

When it comes to engines, some speed fliers hold that you should choose one make and stay with it in all classes possible, but here in the Southwest, that theory does not hold up very well. Class Half-A has only one engine that excels in speed and that is Cox's Thermal Hopper (or Space Bug with Hop-Up kit). Guy Rogers, '53 National Class C Open Winner, consistently turns speeds up to 90 mph with his stock Thermal Hopper. Only the fuel, props and head gasket spacers were changed. Light airplanes do not seem to be the answer in this class as ships weighing over 4 oz. have frequently bettered 85 mph. This baby class is still in the baby stage, but it is developing very rapidly.

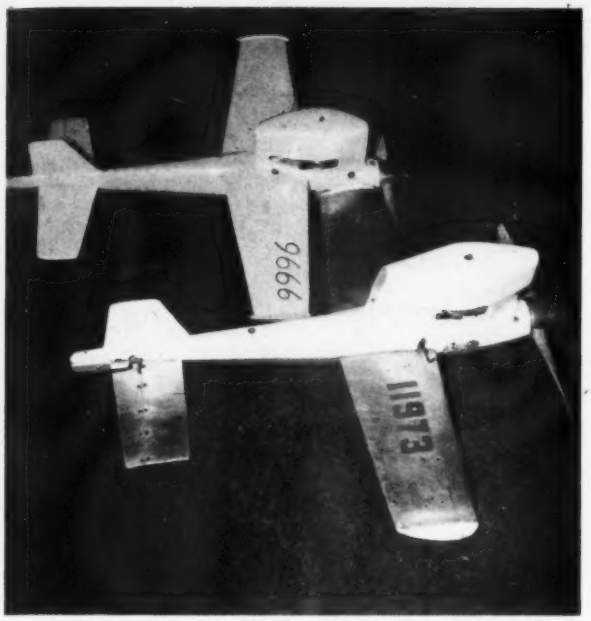
Class A is a real tough class to pick one outstanding engine. McCoy .19's have been the leaders for many years and there are still some very good McCoy's at every contest, but as an average stock engine, the Torp .19 also has established itself as one of the fastest. The only necessary modification is removal of the venturi choke and tapping the needle valve holes with a 10-32 size tap to allow use of a Dooling needle valve and jet. The exhaust is normally cut off to facilitate easy cowling. Tommy Baker, who, at this writing, holds the Class A Open record at 133 mph, says all he does to hop up his engine is free it and clean up the ports.

The Fox .19 may be another engine to watch in this class, however, as the 1954 version with the new case shows great possibilities when converted to speed use. The big advantage is that the working parts are all hardened and polished, which should make for very long life. The venturi should be cut off a little and drilled to a size 9/32 hole to give it the speed treatment. The width can be cut down a bit as the holes are drilled to fit a Fox 29-35 mounting.

Class B engines narrow down to a choice between a McCoy or Dooling .29. One big advantage of the McCoy is that it is currently in production and of course you may rework it in the manner E. C. Martin described in the April, 1954 issue of MAN. However, for the average builder hereabouts, a stock Dooling does a good job.

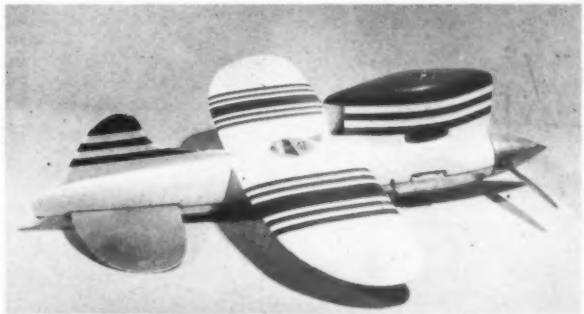
Stock Dooling .29's have produced speeds ranging from 124 to 131 mph using This-Is-It fuel (or similar fuel using 40 per cent Nitro), 7x9 Plasticoat Toronado prop, O & R racing plug (or similar racing plug), and a pen bladder tank. The almost universal transition to the pen bladder tank in the Southwestern area has boosted the top speeds in this class during the past two years from around 118 to 130-140 mph. Bill Timmons of Fort Worth did 142 in May of '53. His main variation from the stock Dooling .29 was a chromed sleeve. In the Southwestern Model Championships in September, 1953, first place was won by Clem and Beasley with a 139-plus mph. Timmons was second with 135 mph. Both were flying Doolings. At the end of the day, five people had bettered 130 mph and any one of their speeds would have been sufficient to have won either the Nationals or Internationals.

Class C has become a race between the stock McCoy's. Just as the Dooling .61 reigned supreme in race cars, the McCoy .60 is all powerful in speed flying. The new McCoy whisked off honors in all age classifications at the '53 Nationals and set records in both Senior and Open Classes at the Plymouth Internationals. Frank Stone bettered his



Two of the fastest, most consistent models in the country: top, Frank Stone's (157.24), and, bottom, the author's (155.38). Note Stone's tips.

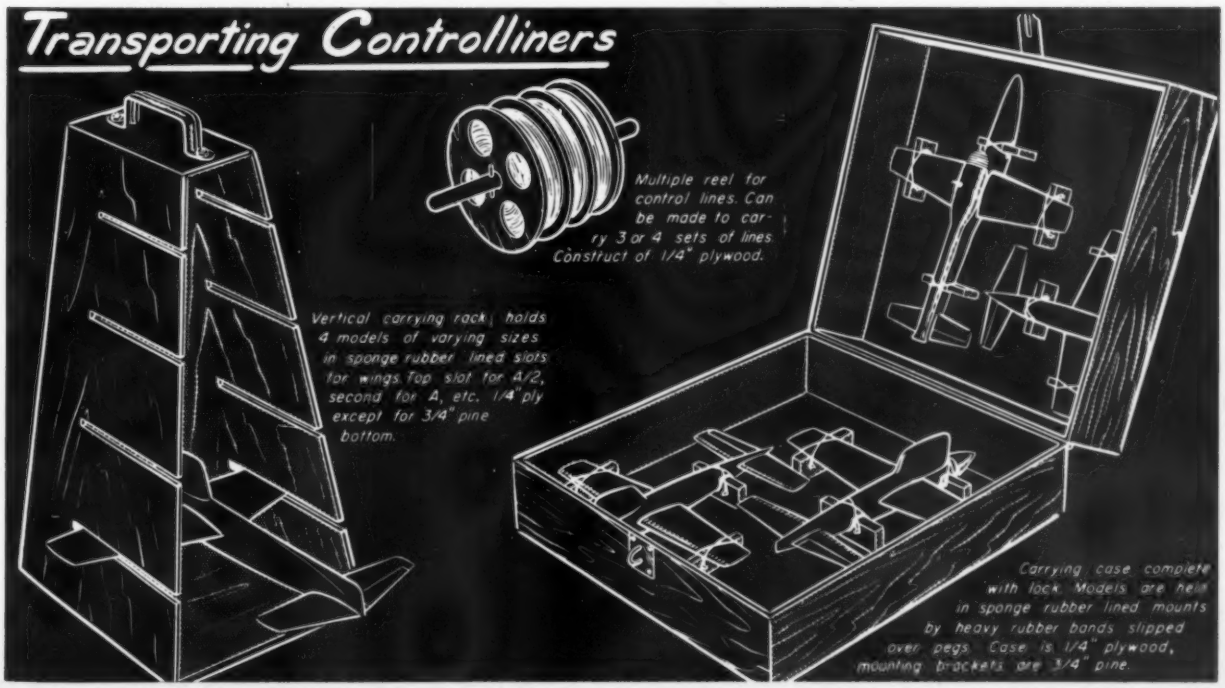
Monoline .29 speedster took a first for author at 129.44 in Abilene, Tex. Dolly, described last issue, shows to advantage in this picture.

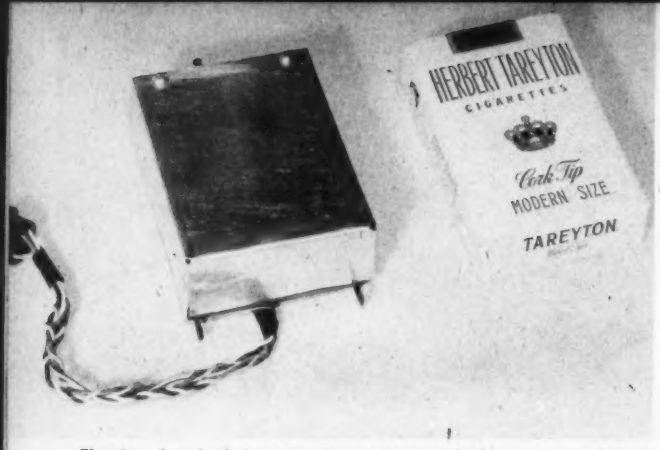


Though large and heavy, Earl Cayton's fine Speedwagon has a string of wins in Pacific Northwest. Consistent, it flies between 146 and 149 mph.

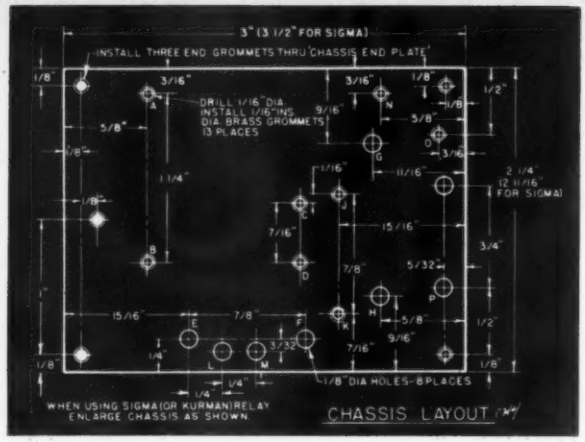
own Open Class C record with a flight of 157-plus mph only to have Leland Mortin take another stock McCoy .60 and do 160.51 mph on the same day. As for novice and experts alike, the McCoy .60 is very hard to beat. Incidentally, the day this record was set, 150 was bettered ten times: five times by Stone, two by Mortin, and three times by yours truly. My best speed was 155.38 mph.

For best engine maintenance, you should keep the venturi and exhaust covered at all times, whether you are working on the airplane or are on the flying field. I find Kleenex tissue suitable for this. Always keep the engine lubricated with some sort of lightweight oil— (*Continued on page* 48)


Transporting Controllliners
Multiple reel for control lines. Can be made to carry 3 or 4 sets of lines. Construct of 1/4" plywood.
Vertical carrying rack holds 4 models of varying sizes in sponge rubber lined slots for wings. Top slot for 4/2, second for A, etc. 1/4" ply except for 3/4" pine bottom.
Carrying case complete with lock. Models are held in sponge rubber lined mounts by heavy rubber bands slipped over pegs. Case is 1/4" plywood, mounting brackets are 3/4" pine.

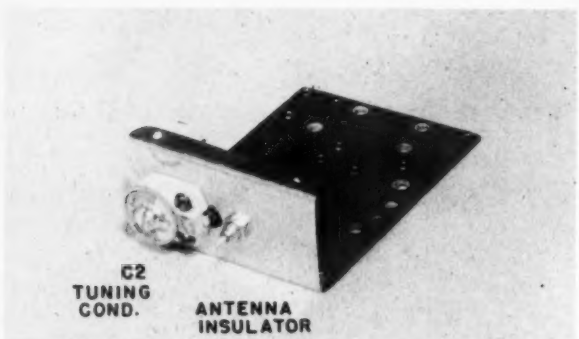


The size of pack of cigarettes, the receiver weighs four ounces and fits in a Half-A powered ship. With Kurman or Sigma Relay, size is larger.

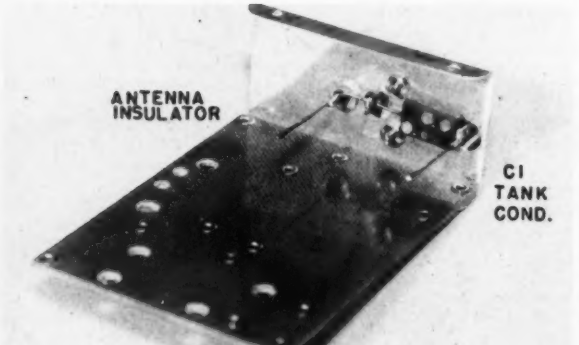

3" (3 1/2" FOR SIGMA)
INSTALL THREE END GROMMETS THRU CHASSIS END PLATE
DRILL 1/16" DIA INSTALL 1/16" ING DIA BRASS GROMMETS (3 PLACES)
2 1/4" (2 11/16" FOR SIGMA)
1/8" DIA HOLES-8 PLACES
WHEN USING SIGMA OR KURMAN RELAY ENLARGE CHASSIS AS SHOWN
CHASSIS LAYOUT

Canned Receiver

This hard tube receiver is a quality item. Unquestioned reliability, stability, lack of trickiness make it ideal for the radio modeler. One side of chassis assembly allows shock-proof vertical mounting. Protective can keeps out dirt, from which flying fields are made. Was tested well over a year.

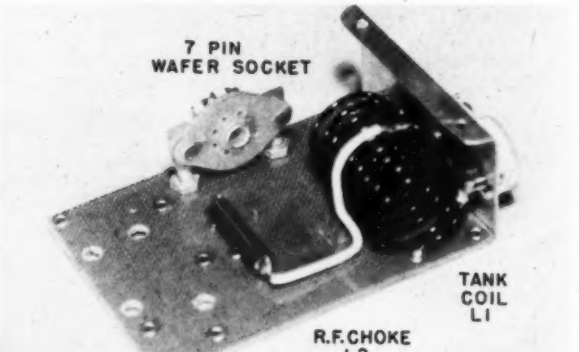


Tuning condenser (C2) attaches to chassis end plate with 2-56 screws, nuts, connections bent through holes. Antenna insulator screws in place.



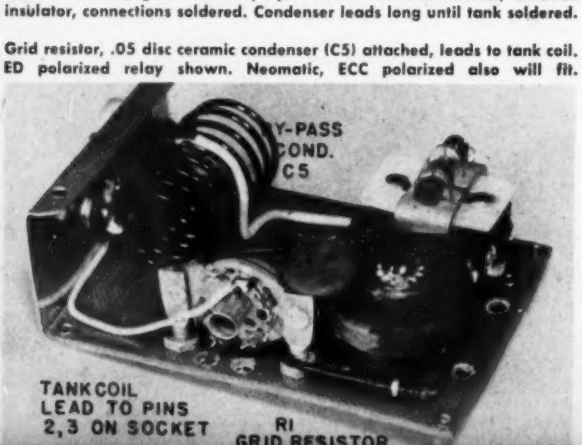
Micarta chassis, grommets in proper holes. Foxed condenser, antenna insulator, connections soldered. Condenser leads long until tank soldered.

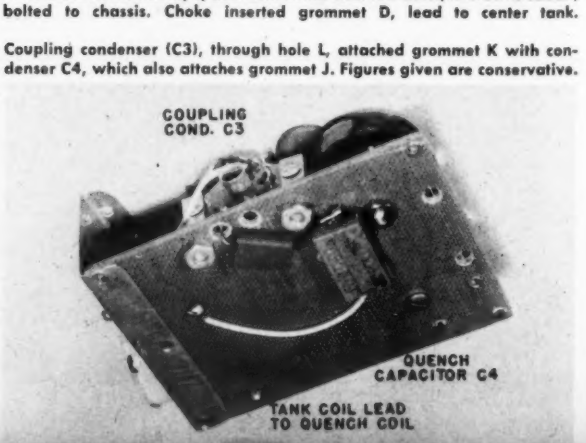
Grid resistor, .05 disc ceramic condenser (C5) attached, leads to tank coil. ED polarized relay shown. Neomatic, ECC polarized also will fit.



Tube socket attached by spade bolts (from OSR coil case), riveted to socket, bolted to chassis. Choke inserted grommet D, lead to center tank.

Coupling condenser (C3), through hole L, attached grommet K with condenser C4, which also attaches grommet J. Figures given are conservative.



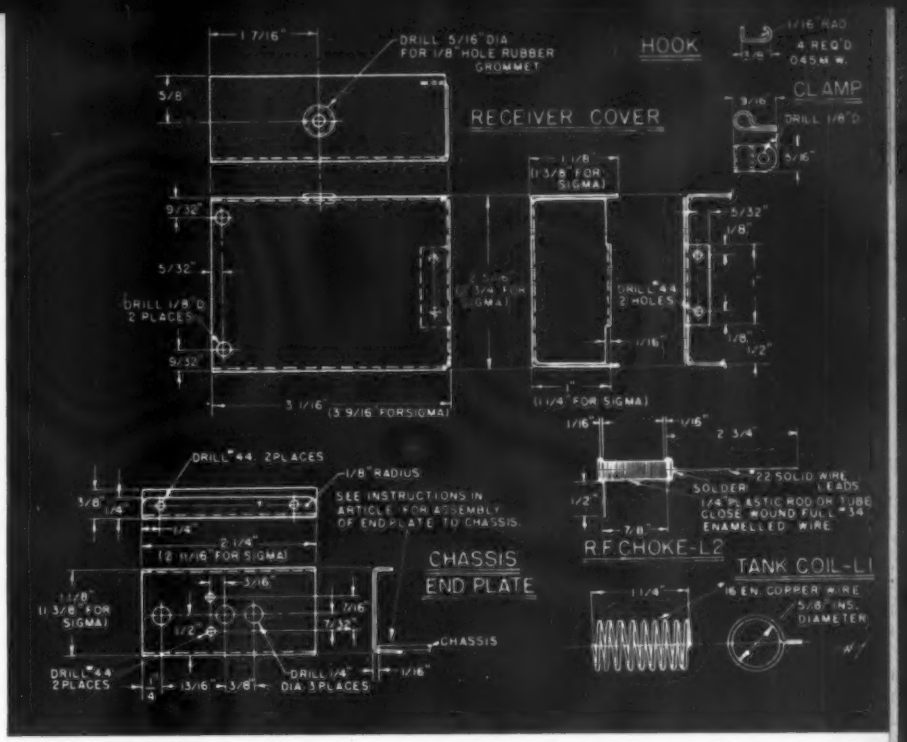


by ED YULKE

Necessity may be the Mother of Invention, but desperation sired this receiver. A few years ago hard (vacuum) tubes provided the long life we wanted in model receivers, but introduced new problems. The standard hard-tube sets with a "sensitivity" control provided good range, but if tuned too finely for this range, would probably *transmit* a strong enough signal near the transmitter to make the crystal oscillate, knock down the idle (plate current) of the receiver and the escapement would bang back and forth at a great rate. Another characteristic of fine adjustment was that, as soon as launched, and body capacity of the "launchee" was removed, the idle current would become unstable and the rudder would go into its dance like a pulse control job. This was hard on ships and receivers, to put it mildly. Suspended in the cabin like a slingshot, the receiver would slam forward when the ship hit and a bent relay was certain, usually combined with other damage, despite a tether cord.

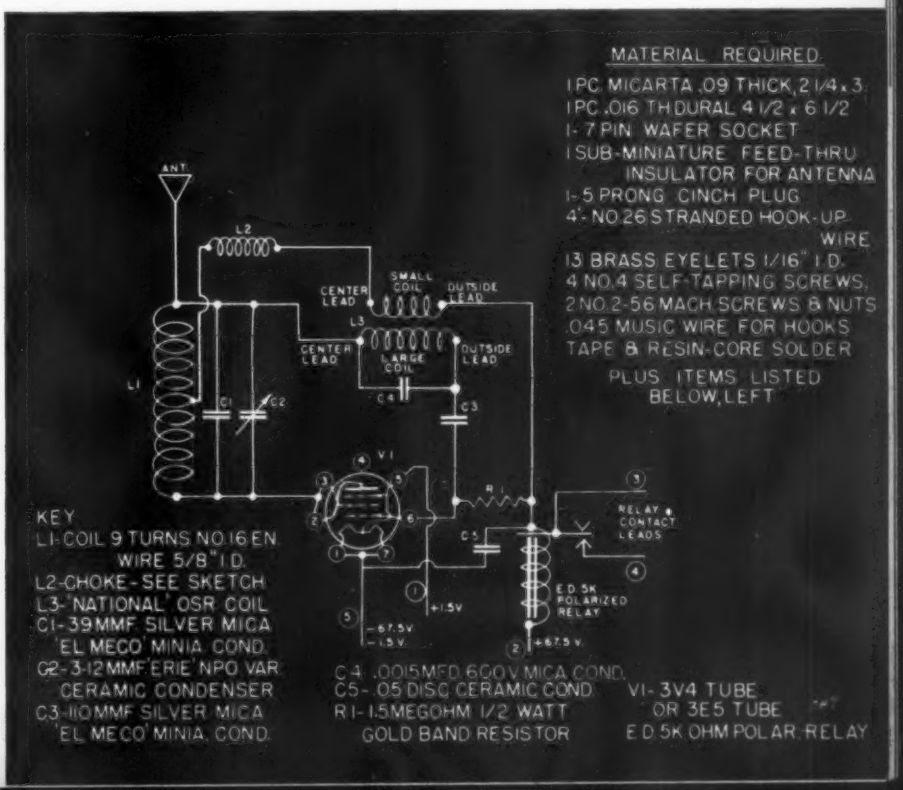
First, we needed a receiver mounting that would survive a crack-up. This was found in the all-on-one-side, foam-rubber-pad and vertically mounted receiver construction. The sponge rubber proved an ideal shock absorber.

Bob Miller's 3V4 receiver (MAN, Jan. '53) had the answer to body capacity, though it was adjustable and thus could be deceptive in tuning. This 1-8 mmf trimmer condenser between the antenna side of the tank coil and the A-minus, B-minus or ground gave built-in capacity which took the place of body capacity when the model was launched. But when backed off until the idle was *just about stable,* although the receiver had half-again the range normally expected, it became unstable with this adjustment as soon as launched. Obviously some sensitivity and some range could be lost in favor of stability and we tackled it from the point of interaction between the tube and the tank coil, the capacity being about the same as the 1-8 mmf trimmer. We tried laying the tube parallel to the tank coil and a small distance away and found we could screw the trimmer out until the screw fell out and the receiver remained stable. Ground range was still ground 1,200 ft. with a 135V, 3A5 tube transmitter. With a 3D6, five-watt transmitter, the ground range was well over 1,500 ft. This was not absolute range but was to the point where the signal-on condition rose to 1 ma. The tip-off that we had accomplished our purpose was that we no longer had to have someone walk 30 to 40 ft. away from the transmitter to launch the ship. The receiver was stable right alongside the transmitter antenna.


DRILL 5/16" DIA FOR 1/8" HOLE RUBBER GROMMET
HOOK
1/16 RAD 4 REQ'D .045 M.W.
CLAMP
DRILL 1/8" D
RECEIVER COVER
DRILL 1/8" D 2 PLACES
DRILL #44 2 HOLES
3 1/16 (3 9/16 FOR SIGMA)
DRILL #44 2 PLACES
1/8" RADIUS
SEE INSTRUCTIONS IN ARTICLE FOR ASSEMBLY OF END PLATE TO CHASSIS.
CHASSIS END PLATE
CHASSIS
DRILL 1/4" DIA 3 PLACES
#22 SOLID WIRE LEADS
SOLDER
1/4" PLASTIC ROD OR TUBE CLOSE WOUND FULL #34 ENAMELLED WIRE
R.F. CHOKE-L2
TANK COIL-L1
#16 EN. COPPER WIRE
5/8" INS. DIAMETER

The success with stability of the circuit has been attested to by the fact that over ten of these receivers have been built and flown for about a year without difficulty. The only thing that remained to satisfy our enthusiasm for a really rugged receiver was to anchor all the parts in place so nothing could shift of its own weight when the foam rubber stopped the receiver. This has been accomplished by soldering condensers to grommets, the end-plate to support the tuning section, the clamp to take the "pull" off the wire connections, and the metal box to support the tube and protect the receiver if anything else tears loose in the plane and flies forward.

The only other point we could think of to improve reliability was to add a spark-quench across the relay points. Suppressing (*Continued on page* 38)



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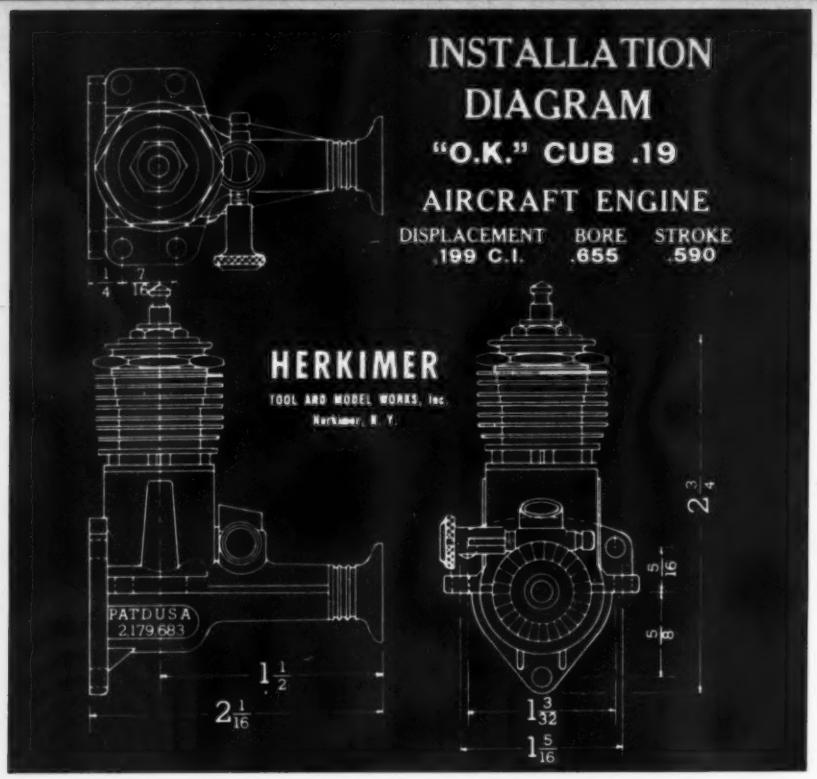
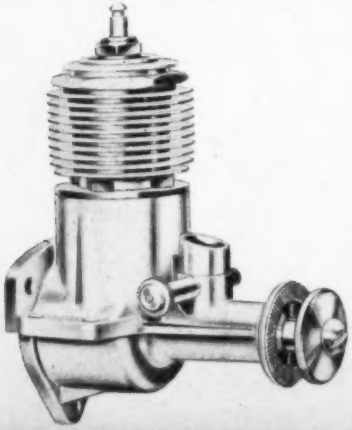


ENGINE REVIEW

by E. C. MARTIN

The Cub line now includes this .19, interchangeable with a .14. Low weight offers possibilities.



The new Cub .19 increases the attraction of the whole Cub range by providing a full Class A motor which is interchangeable, by virtue of identical mounting dimensions, with the International Class Cub .14.

Basically, the new .19 is a bored and stroked Cub .14, employing the same crankcase casting, rear cover, conrod and prop drive assembly, but, in order to transfer greater quantities of mixture from crankcase to bypass ports, the two passages which split the cylinder-retaining threads have been considerably enlarged by milling.

The crankshaft, having a slightly greater throw, is special to the engine and resembles the type used in Cub Diesels in that, instead of a large rectangular valve port, a drilled hole with a shallow flat across its mouth is used. This results in a stronger shaft and is very necessary in view of the small shaft diameter of 9/32 in. The inevitable drop in volumetric efficiency and maximum power resulting from this type of valve port is offset by sub-piston supplementary induction through the exhaust ports around top dead center. An 11/64 in. dia. crankpin and 1/8 in. dia. wrist pin are used with the die cast conrod.

Cylinder design follows conventional Cub practice, having four very wide exhaust ports with interposed angle drilled bypass ports.

The case-hardened steel piston is probably the lightest of its type yet seen on a .19, having 1/16 in. skirt thickness at the mid-length wrist pin bearings and 1/32 in. below. In other respects it is typical of the Cubs, having a conical crown and full length fitted skirt of very fine finish.

The hexagonal aluminum head screws into the cylinder barrel with a slightly longer threaded portion than usual, and accommodates an OK long reach 1/4-32 plug for the first time on a Cub. Three copper head gaskets were fitted under the head of the test engine, each of .004 in. thickness, which points up the critical importance of correct compression ratios. (*Continued on page* 43)

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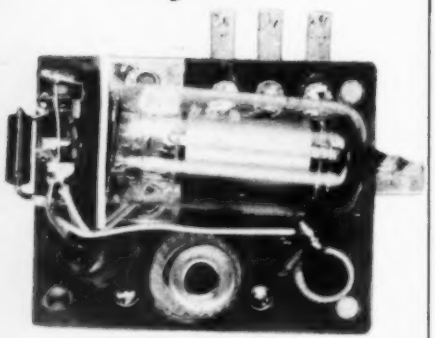

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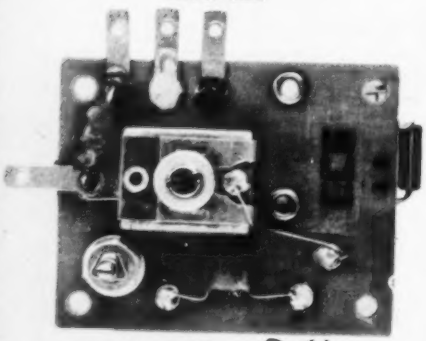

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From the home of the Atom

P. G. F. CHINN

FOREIGN NOTES

With many developments in design, materials, methods taking place throughout the world, the well informed modeler must be internationally minded.

by P. G. F. CHINN

New World Record?

Recently submitted to the FAI is a new Class I (.15 cu. in.) speed mark which, if accepted, will break the present U.S. held record. Flying at Milan in the Giornate Aeromodellistiche Ambrosiane meeting, Italian speed exponent, Amato Prati, circulated his Supertigre G.20S powered model at 190.47 km./hr. (118.35 mph) bettering the present record by some 10 km./hr.

Prati used a new modified model, now in production, of the well-tried *tipo* G.20-Speed Supertigre motor, a front rotary, twin-ball-bearing unit which now has a lapped piston in place of the aluminum piston with two rings formerly employed. The model was of composite wood and metal construction and mostly followed conventional practice with lower pan and detachable top in unit with the solid wood wing. Dihedralled stablizer was of plywood with elevator on inside only.

Australian Compound Escapement

The Australian "Kontrol-Master" RC gear designed by Gil Miles includes a compound escapement of the Bonner type and one of our Australian friends recently sent one of these for our inspection.

The Miles escapement differs considerably from the Bonner in layout, but the principle of operation is much the same. Instead of the four-arm pawl, four pins are riveted onto the toothed wheel, three on one side and one on the other. They are arrested in the required sequence by the armature of the electro magnet, which is placed immediately below the wheel. Thus, all the mechanism of the escapement is on one side of the panel. The entire unit is mounted on a very rigid L-shaped plate of 1/16 in. aluminum. It is 2.4 in. high, 1.6 in. wide and scales 2 oz.

News from China Station

Pan American Airways' worthy efforts in the model building field have now reached Hongkong where, at the request of the Hongkong Model Engineering Club, PAA have held both PAA Load and Clipper Cargo events. Former contest was won by Andrew Wong, Secretary of this club, with RAF-types G. Evans and J. Hawkins second and third.

Amato Prati's Supertigre-powered speed job set FAI record (Class 1), 118.35 mph, at Milan.

The Hongkong club reports an active membership of 53 and offers honorary membership to Allied service modelers visiting the colony. Club may be contacted via P.O. Box 80, Hongkong.

Tyrrell's Team Race Teaser

One of the more notable feats at the Australian Nationals was the winning performance in the Class B team race when the Johnny Brehaut/Monty Tyrrell hopped-up Ohlsson & Rice .23 powered job covered the 10 miles at 77 mph with only *one* pitstop, and glided across the finish line with a quarter-lap to spare.

Aussie team racing is run under basically U. S. rules: i.e., 60-ft. lines and 1-oz. tanks—*not* the 52-1/2-ft. lines and 30 c.c. tanks of the British team race regulations—and the model is reported to have been processed and double-processed to confirm the outstanding speed and economy achieved. In the five-mile eliminating heat, the model, pit-crewed by Brehaut and flown by Tyrrell, came through without a pitstop at 76 mph, while 72-1/2 laps at 77 mph were covered on the first leg of the final. The fuel mix, we are told, cost around 22¢ per tankul, which suggests that it is in the fuel blend that the secret lies . . . but Tyrrell isn't telling.

Australian Reed-Valve Motor

Austria has had no model aircraft engines of her own in actual production up to the present, but a new motor has lately appeared in Vienna which may fill this need. This

Tremendously popular in Japan, modeling begins with simple fliers like these stick designs seen at a Tokyo children's contest, held last Spring Hibiya Park. Model Airplane Federation sponsored meet.

motor, built by one Herr Bugl, is of quite interesting specification.

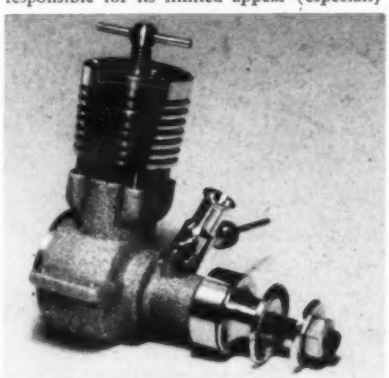
The Bugl motor is, as we might expect, a Diesel and is of the very popular 2.5 c.c. class—.15 cu. in. For a .15, it is a very short-stroke design, the bore being .614 in. With a stroke of .512 in. The crankshaft is mounted in two SKF ball bearings and an unusual feature of the Bugl (but one which has received more attention since its highly successful appearance in the Cox Space Bug and Thermal Hopper engines) is the reed-valve intake system. In the Bugl, this is combined with a conventional needle-valve and rear intake carburetor and the reed itself is of .06 m.m. hardened steel. The motor is for beam mounting and weighs just over 5 oz.

Cuban Controlline Capers

As a cure for lack of interest in pure speed events, Julio César Más, Aeromodeling Director of the Dirección Nacional de Deportes, has initiated a new type of controlline speed event known as "plus and minus 36," reports Tony Alvarado from Habana.

The title "plus and minus 36" summarizes the rules: the models must be over 36 in. in span and have a less than .36 cu. in. displacement motor. As this takes in most stunt and combat models, response has been good. Models are flown against the clock on 60 ft. lines and top times in a recent contest were 89.07 and 86.5 mph.

Already, it is said, fliers have been so bitten by the idea of more and more speed that there is evidence of a revival of interest in pure speed models. However, we imagine that, since progression toward intense development and specialization in speed is largely responsible for its limited appeal (especially noticeable outside the United States), there will continue to be a place for the "plus and minus 36" type contest.



The powerful Oliver Tiger-Cub .09 described last month. Diesel, it features twin ball bearings.

Belgian International RC Meet

At last year's meeting, the first of this newly insituted International RC contest, we were given a foretaste of what to expect from future German participation. This year, the German entries of Kurt Stegmaier and Hans Lichius scored an impressive 1-2 win in the King of the Belgians Cup contest, over the remainder of the entry in which France, Great Britain, Belgium, Holland, Switzerland and Canada were represented.

Both Stegmaier and Lichius (who was only nine points behind his compatriot and 144 points ahead of third man Gobeaux of Belgium, last year's winner) flew models differing widely from the typical American or British RC job. Stegmaier's was of decidedly "vintage" appearance, being a shoulder-wing model with forward placed stalky landing-gear, the effect being remiscent of the Shereshaw/Weiss/Tlush ships of the mid-1930's. His equipment, however, was highly original, being of the multi-channel tubed-reed type, but with pneumatically operated servos in-

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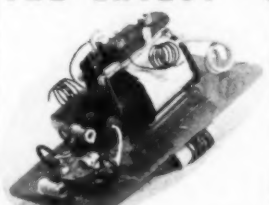

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Pan American sponsors PAA Load events all over the world. Winners, first meet, Hongkong, China, G. Evans, Andrew Wong, J. Hawkins, shown with planes center, left to right. PAA local officials, others.

FOREIGN

stead of escapements. Air pressure for these was supplied by the motor, a Diesel of Stegmaier's own design.

In contrast, Lichius' model was a scale Fieseler Storch. It used an E.D. three-reed receiver modified to six reeds and bearing a control-stick type box. Flying of both models was to a very high standard.

The meet also included the Royal Belgian Aero Club Cup contest for RC gliders. In this the French former speed exponent, Dr. Millet, was narrowly beaten by Mabille of Belgium.

Trends in Trinidad

The sight of a model with "Trinidad" blazoned across it has not been entirely unfamiliar at Wakefield contests and a report from the British West Indies confirms that this type of model still attracts builders there. Nevertheless, power models, including controlline, have their adherents. Both British and American model equipment are well represented with many modelers tending to favor the glow plug motor for its allegedly

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NOTES

more consistent performance under tropical climatic conditions. The first Trinidad stunt contest, held May 30, was won by C. E. Berridge, flying a Fox .35-powered Nobler from George Aldrich's MAN plans.

British Nationals

The British Nationals, held June 5-7, was again at the Royal Air Force station, Waterbeach, near Cambridge, but did not enjoy the fine weather of last year. When the showers came down, we thanked the little windshield sticker which had permitted us to take the car up to each event instead of leaving it on the parking lot.

Standards of flying in rubber, glider and free flight power were, we would say, as high as they have ever been, but stagnation seemed evident in stunt, where the standard of performance in the Gold Trophy event appeared to have fallen back.

Located in a part of the country where a number of RAF/USAF airfields are sited, many service modelers were in attendance.

END

From far off Kuala Lumpur, Malaya, W. V. Symes sends shot of Douglas Lee, left, with flying saucer; T. S. Sthipam, with ducted fan Russian fighter. Both men members Selangor Model Aeronautics Club.

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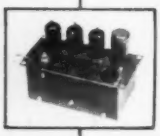

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FLASH NEWS

After the "fantastic" projects of the past year, it is hard to get excited about anything. But there's no stopping inspired engineers.

By ROBERT McLARREN

America now has a civil jet transport in the air and ready for production orders. First flight of the sleek *Boeing 707* followed by six weeks the final taxi test which ended in a smashed left main landing gear. Boeing test pilot Alvin M. "Tex" Johnson conducted five days of taxi tests on the redesigned gear and gave it especially severe treatment before shoving the throttles of the four Pratt & Whitney J57 turbojet engines all the way forward and lifting America's first civil jet transport aloft in a surprisingly steep climb. Next step on the 707 agenda: award of an Air Force contract for quantity production of the *Jet Stratotanker* version for the Strategic Air Command. After quantity production is under way, its civil price will have dropped low enough and U.S. airlines will have used up enough of their DC-6/7 and Super Constellation investments to move into the jet airline age along about 1957.

U.S. now has two one-man rocket helicopters flying under Navy sponsorship, but the real customer is the U.S. Army, which is watching developments closely. The *Rotor-Craft RH-1* and the *Kellett KH-15* are powered by Reaction Motors rocket motors of about 16 lb. static thrust at each tip of the two-blade rotors. Both carry the hydrogen peroxide fuel in tanks on the central framework and the rocket motors can be throttled like a conventional power plant, a significant new development in the field. Navy has sponsored two developments on behalf of the Marine Corps, which is interested in such tactical missions as despatch transmission, battle field observation and short-range communications. Army Transportation Corp has a one-man helicopter competition under way with the winner slated to receive orders counted in the hundreds.

The famed North American-Ryan Navion has gone through so many face-lifting operations, it is now wholly unrecognizable. The Riley twin-engine version is familiar but now comes Camair (Aviation Division, Cameron Iron Works, Galveston, Tex.) with a new version featuring not only two Continental 240 hp engines but a new, high tail and tip tanks for the 68-gal. fuel supply. The new Camair Model 480 has a cruising speed of 192 mph @ 72 per cent power @ 6,000 ft. Camair offers the modification work on a used Navion for $32,000 or a price of $37,000 on a brand-new version.

Helio Aircraft Corp. is now ready to take orders on its famed Courier safety plane after substantial redesign of the 1949 prototype. The new model is of all-metal construction and uses a 260 hp Lycoming engine to gain its cruising speed of 157 mph @ 72 per cent power at 8,500 ft. While not top four-place performance, the Courier tops its competitors by getting airborne with a full load in just 220 ft. take-off and landing at the astonishingly low figure of about 25 mph. Actually, the new Courier can fly safely at only 30 mph. Price tag at this writing is $24,500 and the first production group of 10 has been sold. A second group of 10 will follow shortly down Helio's Boston, Mass. production line.

Every few months a new scientific difficulty rises up to plague the aircraft designer (sonic barrier, heat barrier, etc.). The latest of these is "afterburner screech." Naturally, nobody had to tell the scientists that an afterburner screeches, as anyone who has been in the same county with an afterburner on take-off can testify. But it turns out that screeching can be destructive to the afterburner, tearing out great chunks of its inner lining. The damage, and the noise, are caused by unsteady burning and can be cured only after extensive scientific measurements of combustor performance, afterburner flow and the type of fuel being used. But a screeching afterburner, from now on, will be a signal that structural damage is imminent if the condition is not corrected shortly.

The Boeing *Stratocruiser*, despite its fine performance and great capacity, was not a commercial success because of its high cost and only 56 machines were delivered. Now, however, there is a strong likelihood that hundreds of *Stratocruisers* may yet go into airline service. Reason: General Curtis E. LeMay, SAC commander, is investigating the possibility of disposing by surplus sale of about 500 Boeing C-97 aerial refuelers when his jet refuelers start being delivered. SAC has ordered about 800 KC-97 tankers, of which about 500 have been delivered, yet SAC is heavily jet bomber-equipped. When the mighty Boeing B-52 *Stratofortress* gets into production next Fall, LeMay will need jet-powered tankers to refuel it.

The aircraft manufacturing industry is now the largest employer in the nation, thus bringing victory in a 50-year race. The industry now employs 823,000 workers, compared with only 786,000 in the automobile manufacturing business, the nation's second largest. Actually, when the aircraft engine, propellers, accessory and equipment manufacturers are included, the aircraft industry employs 1,900,000 people. Oddly enough, aircraft workers are not as productive as auto workers, however, and the value of goods produced by the lesser number of the latter is greater than the aircraft industry.

Lockheed and TWA have not taken the fabulous performance of the Douglas DC-7 lying down. For the past six months engineers of both companies have been coaxing additional speed out of the *Super Constellation* to enable it to compete more closely in the non-

(*Continued on page* 38)

CORRECTION

In the Gyro Electronics adv., page 48, Aug. issue, the statement was made: "1st Prize N. Y. Mirror Air Show." This should not be construed as meaning that Gyro took 1st prize in the radio event. The equipment used in the prize-winning RC event was made by Babcock Radio Eng. Co. of Van Nuys, Calif. A Gyro transmitter was awarded to the 1st place winner Class B Adult F. F.

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stop transcontinental race. To date, modifications have increased its cruising speed by 12 mph to 356 mph, only 4 mph short of the DC-7. Modifications include lengthened engine nacelles with larger, longer propeller spinners, extended wing-fuselage fillets, either sealing or reducing in size wing openings for the air conditioning system and removing the wing walkways. But Douglas is not being idle; it, too, is just as busily "cleaning up" its Blue Ribbon transport, looking toward a 370 mph cruising speed, which would clip another 13-1/2 minutes from its transcontinental time.

Don't think for a minute that the Russians are loafing. That is the byword in the U.S. aviation business, from factory worker to Air Force General. The latest Russian Air Force demonstration included yet another four-jet, swept-wing bomber, this one the most advanced yet revealed. Looking generally like an enlarged deHavilland Comet, the new bomber has its four engines buried close inboard in the wings. Simultaneously, the Russians announced that one of their "test" planes had attained a speed of 1,659 mph, and that a supersonic fighter is now in production. Just to show they are keeping up in the helicopter field, the Reds recently staged a mass helicopter delivery of troops using 33 very large machines from which rolled light artillery, jeeps, weapon carriers and troops.

North American is pressing development of its supersonic F-100 *Super Sabre* fighter as rapidly as possible. Now in production is the F-100A standard day fighter, and nearing production is the F-107 (formerly the F-100B) all-weather version and the F-100C fighter-bomber version, featuring a variety of external bomb, rocket and fuel loads (including automatic-homing guided missiles).

Convair reports continued progress in its development of the hydro-ski XF2Y-1 *Sea Dart*. The prototype has been fitted with

(*Continued on page* 54)

Canned Receiver

(*Continued from page* 27)

the spark, as we did, with a 47 ohm, 1/2-watt resistor and .1 mfd. paper condenser in series across the relay points will minimize the inductive kick when the points break open, particularly with escapements using the larger coils (8-12 ohms), *but the quench does not eliminate the need to clean the points of the relay regularly.* Vernon Macnabb recommends a Dollar Bill drawn between the points.

We've gone to extremes in the use of the best grade, most reliable parts in building receivers. Many fellows have written to the magazine saying they couldn't get Miller or Lorenz receivers to work as the designers did. Later we found out they had used wide-tolerance parts and had even tried using quench coils other than those specified.

The quench coil (L3) specified in the parts list and the *silver mica* condensers will give you the same consistent, reliable service we've gotten out of the set. In fact, five sets built for other people, identical to the one shown, were assembled, wired, plugged in and ground-checked just as simply as it is stated here. The secret? The parts were all identical; there were no wide tolerances for which to compensate. Just for example, the average molded ceramic condenser has a tolerance (marked right on it) of *plus or minus 20 per cent.* This means that a nominal value of 110 mmf in the coupling condenser (C3) could be from 88 mmf to 132 mmf. How can any set operate as expected under those conditions? We've used all close-tolerance parts here, and suggest that you do, too. The 10 or 15¢ difference in cost per part will add up to only 60 to 90¢ additional cost for the entire receiver—considerably less than the cost of the relay you expect the parts to operate. The relay is the only part that is non-critical and for that reason we've shown chassis and box sizes required for Sigma and Kurman relays. We used an E.D. Polarized relay of 5,000 ohms and a Neomatic 5,000 ohm relay. The only difference between relays will be the idling current. For the E.D., Kurman and Neomatic the idle is 2.6 ma (60V plate current), but with the sigma it is only 2.1 ma. Drop with all is to .8 ma on signal.

If you're on your way to the radio supply store by now, don't forget to get *.09 thick* (3/32 in.) Micarta for the chassis, unless you're using the Sigma relay. With the added weight, we'd suggest *1/8 in. thick* Micarta.

There are only 21 holes in the chassis and they can be drilled with two drills—one a No. 52 (close to a 1/16 in. dia.) and the other a No. 30 (close to 1/8 in. dia.). Install 10 grommets (1/16 in. inside dia.) as shown by the holes with the double circles, leaving the other three out until you are ready to attach the chassis end piece, which is made of .020 or .025 thick dural sheet. This piece is laid out according to the sketch, bent over a vise jaw and the two screw holes drilled in the narrow flange. The three grommet holes (1/16 in. dia.) are best drilled by clamping the end piece to the chassis, using the chassis as a drill guide. Install the three grommets and you are ready for the electronics business.

So the writer doesn't have a grommet punch either! Ever think of flaring the end slightly with a tapered scratch awl and then peaning the flange over tightly with a small hammer?

First in the order of mounting business should be the tuning condenser (C2). The legs should be bent down to fit through the center of the quarter-inch holes as shown and the condenser attached with two No. 2-56 screws and nuts. The fixed tank condenser (C1) is attached to the legs of (C2) by slipping the wires through the holes in the

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legs and soldering these points.

The antenna insulator is next and has a nut which will lock it to the chassis end piece. The wire from (C1) nearest the center of the chassis is now soldered to the inside end of the insulator. The tank coil, wound over a 5/8 in. dowel, is stretched out to exactly 1-1/4 in. and the ends bent as shown. Scrape the enamel coating off the legs and the exact center of the coil where the choke coil (L2) will attach. Tin the legs of the coil and insert grommets A and B. Solder the coil to the grommets, with the end wires of the fixed condenser (C1) as shown in the photos. Now snip off the excess lengths of wire leads from (C1) condenser. The choke coil (L2) is wound on a piece of 1/4 in. dia. plastic tubing as shown. This choke cannot be smaller, as we found out in building this particular receiver. We tried a 5/32 in. diameter, same length, and the idle current wandered.

One end of the choke coil goes into grommet D; the other end is laid along the chassis and attached to the tank coil at the center point.

The seven-pin wafer socket is attached to the chassis by means of spade bolts, two of which come as part of the OSR coil. Take the OSR coil out of the can, drill out the grommets and rivet the spade bolts to the wafer socket. Be sure pins No.'s 1 and 7 (the two with the space between them) are facing the tank coil end of the chassis. The OSR coil is next stripped of the micarta connection plate by unsoldering the fine wires. Don't worry about which wire is which: the schematic calls them by their location instead of color. Bolt the coil to the chassis with the larger coil of the two, up. The outside wire from the large coil goes into grommet K and the inside wire of the same coil goes into grommet J. Bend the leads of condenser (C4) over and snip them off 1/4 in. long. These will fit into grommets J and K with the coil wires. Solder both grommets. The inside or center lead of the small coil is poked through grommet D and soldered along with the end of the choke coil lead.

Next mount the relay on the chassis as shown in the pictures and attach the lead from the outside of the OSR lower (small) coil to the black connection of the polarized relay or either connection on the coil of other relays.

To this same lug of the relay, attach the end of the .05 disc ceramic condenser (C5) and the grid resistor (R1). Shield these leads with small pieces of spaghetti tubing or covering stripped from insulated wire. The other end of C5 is attached to No. 1 pin of the wafer socket by poking it through and bending it over, but not soldering it just yet. The other end of the grid resistor goes to No. 6 pin of the tube socket. At this point it is best to add the coupling condenser (C3) under the chassis with one lead up through hole L to pin No. 6. Solder No. 6 pin and cut off the other lead of C3 to lay over the grommet K that is already soldered. A touch of flux, a well-heated iron with solder on it, just touched to this connection and that part is finished. Two wires remain to be installed: the one that runs from the outer end of the tank coil (away from the antenna connection) to pins No.'s 2 and 3 of the socket, and the one under the chassis that runs from grommet J to the inside or antenna end of the tank coil at grommet B.

This completes the circuit except for the power feed wires and the relay point connection wires. On the schematic is shown the pin connection numbers on the five-pin Cinch plug we've standardized in this area. Braid the five wires together, leaving about

(*Continued on page* 42)

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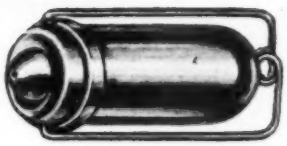

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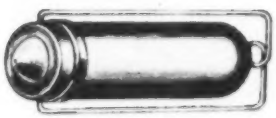

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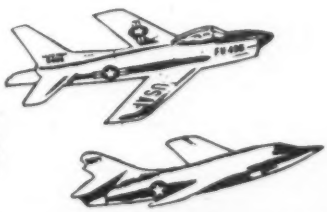

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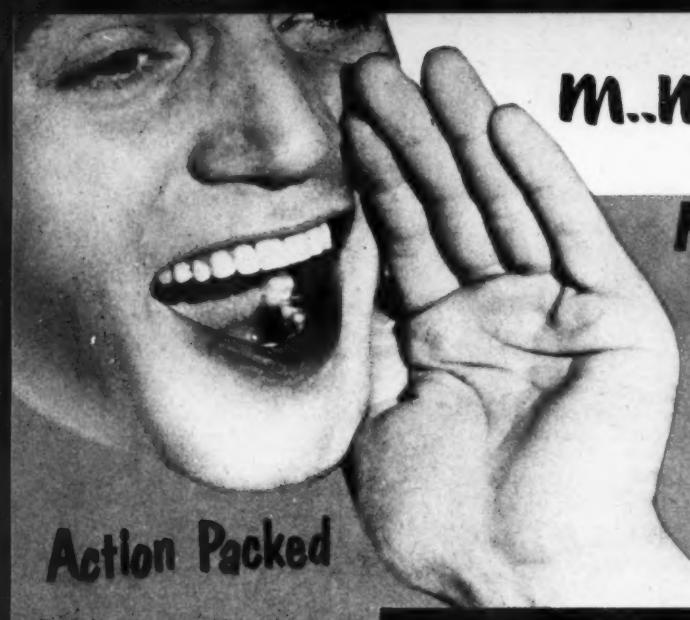

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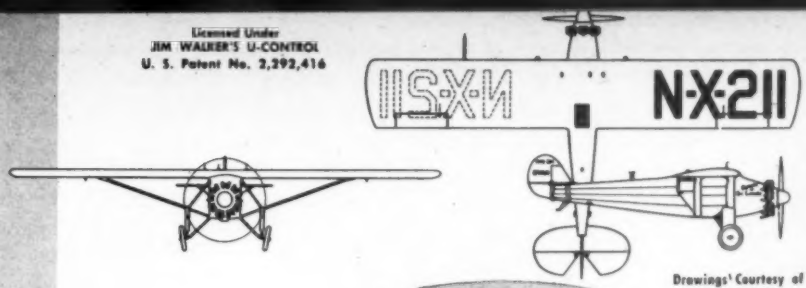

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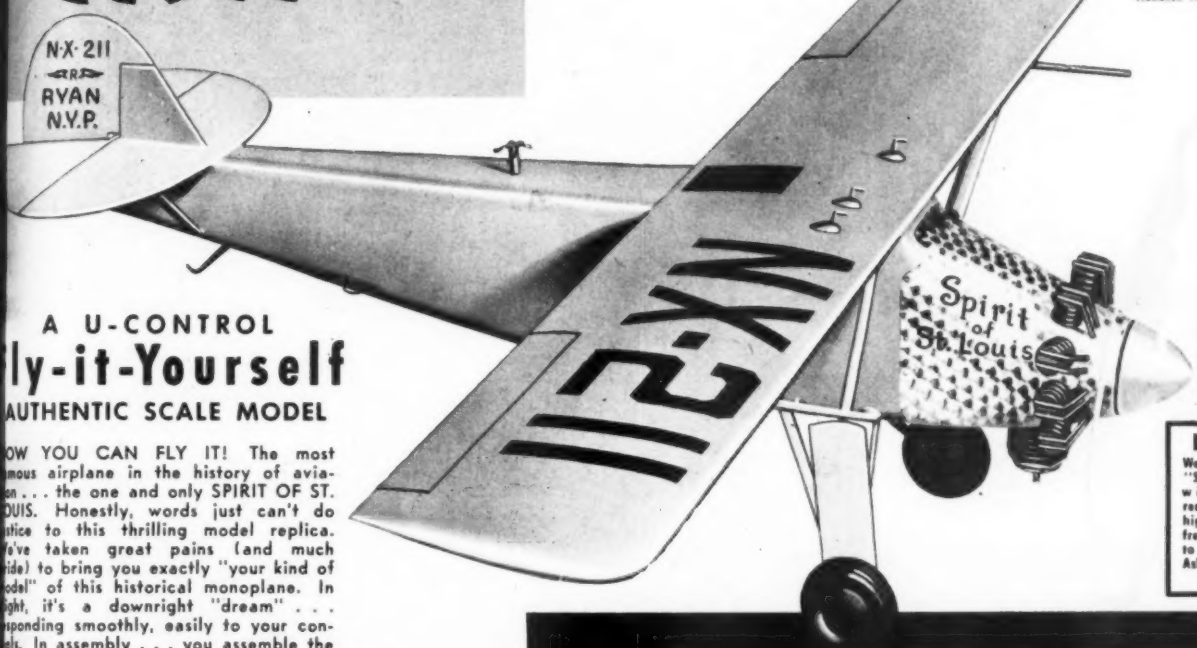

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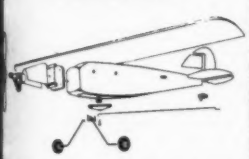

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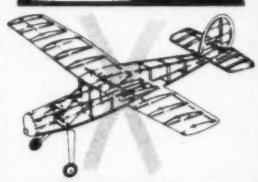

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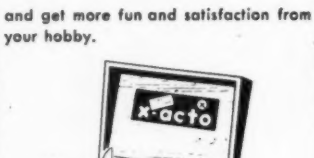

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Canned Receiver

(*Continued from page* 39)

8 in. of wire for a 5 in. pigtail you'll need in the average airplane and poke the B (usually red) lead from No. 2 on the plug up through grommet C to the relay coil lead marked red in case of the E.D. or the opposite lead to the one that carries the grid resistor, condenser and connection to the outside of the small coil on the OSR coil. The No. 5 lead (usually green) is the A-minus, B-minus lead and goes up through hole L with about 1/2 in. of insulation stripped off, and solders to pins No.'s 1 and 7 on the wafer tube socket. The No. 1 lead from the plug, A-plus, comes up through hole M and attaches to pin No. 5 on the tube socket. You will note that No. 4 pin on the socket has no wire attached to it. The 3V4 and 3E5 tubes have identical pin connections, with no connection to No. 4 inside the glass envelope. Next run the two relay point wires (No.'s 3 and 4 on the plug) through holes N and O in the chassis and connect to the points of the relay.

The clamp shown in the photo is not an absolute "must," nor is the can that makes a box of the receiver, but we've found that the wires can be pulled, even through the holes in the chassis, to the point of straining the soldered connections. Make the clamp from a strip of metal left over from the chassis end piece by bending it around a 1/8 in. drill, then drill the clamp with a 1/8 in. hole through both lugs. This hole will be picked up by the No. 4 screw through hole P that holds the can onto the chassis and you will be able to swing this receiver around your head by holding the pigtail. Wrap a few layers of tape around the wires where the clamp sits to prevent chafing of the insulation on the wires.

The box is bent from .020 or .025 sheet dural and instructions are really superfluous. The flange and the three bends of the box can best be done over a hard wood block or, as we did, on the end of vise-jaws. Drill a 5/17 in. dia. hole and insert the rubber grommet for the tube tip.

The last parts to be installed are the hooks for mounting. These are detailed in the drawings. Four are required and are soldered into the grommet in each corner of the chassis.

The antenna on this receiver isn't very critical. We've used 15 to 28 in. with little change in performance. The antenna wire lead can be soldered to the outside of the insulator on the chassis end piece, but we prefer to take a socket out of a five-pin Cinch socket and solder it to the receiver. Where the antenna lead-in on the airplane plugs into this, cut a pin off a Cinch plug of the type used on the pigtail and you have a very handy connection.

If the values and exact parts recommended are used, the receiver should tune to 27.255 megacycles with the slot turned across the condenser or, in other words, at half capacity. You will find, as we did, that the receiver can be tuned at about 50 ft. from the transmitter and will not require fine tuning at extreme range, but to be on the safe side, take a walk. On most five-watt input transmitters, the ground range is 1,500 ft. or more and on the smaller hand-held transmitters, using 135 volt B current, you should get at least a 1,200 ft. ground check before the signal-on condition rises to above 1 mil. The signal off (idle) current should be about 2.6 mils. Dropped out by signal-on from the transmitter, the needle goes down to .8 mil.

Don't use a Budd quench coil, instead of the National OSR, or the receiver won't work. It must be built according to directions. END

(Editor's Note—It is vitally important with any magazine transmitter or receiver to obtain parts exactly as specified.)

Radio Control News

(*Continued from page* 23)

possibly not realize what goes on behind the formulae, an analogy will be made between the Law and a water pump and valve. Fig. B will be referred to in our explanation.

First, we must remember and compare the following: *Voltage*, designated as E, is the pump or pressure exerting force in a circuit. *Resistance*, designated as R, is the valve or flow-restricting element. *Current*, designated as I, is the amount of flow.

Fig. 1a shows a low pressure pump of, say, 10 lb., which will be compared with low voltage, attempting to work against a valve which offers very high or infinite resistance, to the water flow, or current. As can be seen, with infinite resistance, there is no current flow.

Fig. 1b illustrates what happens when the valve is opened slightly, or, in other words, the resistance is lowered. Assume the valve is opened to present 90 per cent resistance to the flow of water. In this case it can be seen by Ohm's Law that this would resolve to $I = \frac{E}{R}$

or, $\frac{10}{.9}$ or $I = 11.1$ This means that the current is equal to the voltage, or pressure, divided by the resistance, and in this case is equal to 11.1 units of resistance, or ohms.

In Fig. 1c, the valve is opened to present 50 per cent resistance to the flow. In this case, $\frac{10}{.5}$ or $I = 20$, showing an increase in flow or current. Fig. 1d shows the valve set to present minimum resistance, say about 10 per cent. Then, in solving the equation, we arrive at $I = 100$, or a greatly increased flow. We cannot assume the valve to be completely open, or offering *no* resistance, since there is no such thing as a perfect conductor or a friction-free movement. From the foregoing we see that electrical current flow, like water flow, increases as the resistance or valving action is decreased.

We shall now increase the pump pressure, or voltage, to 20 and it can then be seen in Fig. 1e that, even though the pressure is increased, if the valve offers infinite resistance, there is no flow.

However, in Fig. 1f, we have opened the valve to 90 per cent of its resistance and from the formula we then have $\frac{20}{.9}$ or $I = 22.2$, which is double the value obtained from Fig. 1b. Opening the valve further, or decreasing the resistance, we get an increasing flow—in fact, twice the amount obtained with 20 lb. pressure as with 10 lb.

Now, what have we learned? First, it has been proved that an increase in voltage (or pump pressure) increases the current (or water) flow, provided the resistance (or valve opening) remains the same. Also, we know the current will increase if the resistance is decreased, with the voltage remaining the same, of course. It can now be seen that if the voltage, resistance or current changes, it will affect the value of one of the other component factors. Thus we arrive at the following formula for Ohm's Law:

$E = I \times R$ (E representing volts)

$I = \frac{E}{R}$ (I representing amperes)

$R = \frac{E}{I}$ (R representing ohms)

It must be remembered that there are variable factors in every electrical or radio circuit which must be in balance for the circuit to function properly. Also, keep in mind the

(*Continued on page* 44)

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PAUL K. GUILLOW Inc.
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Engine Review

(*Continued from page* 30)

All workmanship throughout this engine is up to the very high standard we take for granted in Cubs, and while it is evident that the adjective "rugged" cannot be applied in this case, since everything except the bore and stroke is small for the displacement, it is nevertheless equally as powerful as its predecessor, the Ben Shereshaw-designed Bantam, but does not have the same complication or weight, and seems well able to take all the rigors of normal use.

Weight is the operative word with this engine, as it is easily the lightest .19 in production anywhere, and closely approaches a power/weight ratio of 1.5 bhp/lb., which is an achievement in small engine design, and makes it especially interesting for Class A free flight, and perhaps even more so for ducted fan models where weight and thrust are more critical.

A simple and effective idea for these engine tests which we have borrowed from Harold deBolt is standing a glass of water on the test rig as an indication of vibration, and being unable to think of anything better, other than a complicated bouncing pin contraption as used with full sized engines, we now use this as a means of giving a comparison of running smoothness. In this case it is not difficult, as, because of the low weight and resulting lack of vibration damping inertia, the new Cub is not too smooth for its displacement. For a positive check we gave the Cub .14 a run and found that between 8-10,000 rpm there is little difference, but at higher speeds the larger engine becomes progressively more shaky. This is unusual, as vibration usually decreases at higher speeds, but for most applications it is a small penalty for the exceptional weight advantage.

Running behavior of the .19 is good in the starting department, but rather more critical on maximum speed needle adjustment compared with the .14, Oe-eighth of a turn either side of the optimum setting made a noticeable difference, and at high speeds the engine tends to hunt. Movement of the fuel tank and consequent alteration of fuel pressure causes considerable variation in rpm and may detract from its lightweight possibilities for stunt.

Blipping the engine by pinching and releasing the fuel tube showed positive recovery abilities, but a reluctance to gain rpm quickly.

Priming was required for cold starting, but not when hot. Choking sucks in enough fuel with one flip, and does not empty the fuel line by blowback.

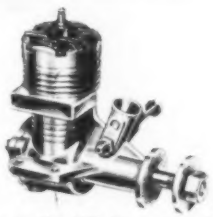
The light weight of the new Cub offers possibilities where big engine torque is required. Other than that, the engine makes a good trainer for those graduating into the larger displacement classes.

TEST: Herkimer OK Cub .19

Plug: OK 1/4-32 Long Reach as supplied. 1-1/2 volts to start; Fuel: Supersonic 1000; Running Time Prior to Test: 1-3/4 hours; Bore: .655 in.; Stroke: .590 in.; Weight: 2.9 oz.

Power Prop	*RPM*
9 x 6	11,000
8 x 8	11,300
8 x 6	12,100
7 x 8	12,000
7 x 6	12,800
7 x 4	13,700
Top Flite	
9 x 6	9,900
8 x 8	10,400
8 x 6	11,800
7 x 6	12,600
7 x 4	13,300

END



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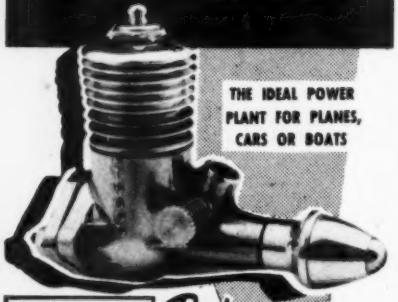

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ACE "CLUB COUPE" KIT No. 49R

$1.25 without Power Unit

AT ALL MODEL AND HOBBY SHOPS

Radio Control News

(*Continued from page* 42)

fact that there is no perfect conductor or insulator. Even the wire used to hook up escapements, etc., has resistance and therefore will restrict the flow of current. In view of this, it is possible that an escapement with a 5-ohm coil will work perfectly when touching the battery terminals directly to the coil leads. But, if the wire used to make the hook-up is too small or too long, thus offering appreciable resistance, say about 2 ohms, the escapement may fail to function properly with the same amount of applied voltage. Why? Let's look at the formula and see.

With a 5-ohm coil and 3 volts as the supply, the current will be I=3/5 or I=.600 amps or 600 mils. This is the amount of current required to give the proper ampere turns for the coil to function properly. Now, if we use wire which is too small or too long in diameter, so as to add 2 more ohms of resistance to the hook-up (even poor connections will add resistance), we have the following: I=3/7 or I=.428 amps or 428 mils, a decrease of 170 mils from the ideal condition of 600 mils.

We're sure this explanation will help you improve your flying and designing and if there is any particular phase of theory you'd like to read about in MAN, let us know.

NEW ITEMS

Sigma Instruments, Inc., of South Braintree, Mass., makers of world famous sensitive relays, have a new relay designed especially for RC work. This new model 26F 8000-CDS was designed by radio control modelers at the company and they have incorporated all the features that point to a rosy future for this new relay. Measuring 1 x 1 x 1-3/4 in. and weighing but 2 oz. (smaller and lighter than the 4F), this 8,000-ohm relay is factory set to pull in at .6 to .7 ma DC. Drop-out current is about .2 ma less than the pull on current. The only adjustment on this unique relay is used to change the point of pull-in and drop-out simultaneously. The differential current may be changed by adjusting the normally open point—that is, the difference between pull-in and drop-out may be increased to about .4 ma. The magnetic design on this relay may make the current differential much closer than is normally used on relays for RC work, and yet the operation of the relay is unimpaired. Despite normal vibration, which may be encountered in the average model, this relay excels where small current changes are involved. Super-sensitive, it will operate on 6 volts DC, and it is resistant to 100 G's shock. For single-tube receivers, where it is desired to idle the plate current about 1 ma, or even less, we highly recommend this new relay. Incidentally, we placed one of these relays in our plane and deliberately introduced considerable vibration to the structure by offbalancing the prop. The relay was mounted solidly to the fuselage firewall and adjusted to pull in at .9 ma. Full operating current was 1.1 ma with a minimum of .1 ma. Operation was perfect with both *on* and *off* signal.

Something new in the electronic field comes from the Illinois Condenser Co. of 1616 Throop St., Chicago 22. The accompanying photo shows representative miniature and subminiature capacitors ranging in physical size from 1/8 in. to 3/8 in. diameter and from 1/2 in. to 1-1/4 in. in length. They have a capacity range of 1/2 to 100 mfd with a working voltage from 3 to 75 VDC. Excellent for transistor work. Prices and additional information available from the manufacturer.

Wilson's of Cleveland, 425 Lakeside Ave., N.W., Cleveland, Ohio, makers of the well known "Tiny Atom" line of small DC motors, have quite a few new items we consider worthy additions to experimental work. For RC boat or car work, there is a new 3-6V ball bearing motor with heavy duty brushes. Complete with a worm gear, pinion, pulley and spur gear, this new model No. 96 sells for $4. Next are two items for the serious RC experimenter. Kit No. 88, which sells for $2, is a pulley and tension belt set. The 1/4 in. to 3/4 in. pulleys fit 3/32 in. shafts and we'd suggest something like this for cars or boats. Kit No. 700 is the answer to the call for an extra gear or shaft. Packaged in a plastic case and selling for $10, this kit is a complete assortment of gears, pinions, shafts, worm gears, belts, pulleys, friction drives, bearing brackets and other much used items.

Ectron Products Co., Box 393, Smyrna, Ga., manufacturers of the Ecco Multitrol escapement (described in an earlier column), are now announcing a new model which gives, in addition to the regular rudder and elevator control, two additional circuits for motor or other control. Like the original model, this unit is self-neutralizing, weighs a scant 2 oz. and has a high torque output for rudder and elevator control. In addition to the escapement, they also offer the "Rapid Pulse Stick Ground Controller." This very compact handheld unit provides accurate rudder, elevator and engine control by regular stick control. One very important feature we would like to point out is that all signals are pulsed by means of micro switches, thus assuring sharp signals. Variable pulse rate is also provided.

Ectron also has a new four-cell battery box to fit pencells or size "C" cells. Featuring individual spring loaded contacts and sturdy aluminum and heavy fibre insulation, both models may be used for 1-1/2, 3, 4-1/2 or 6 volts, or in combination to furnish 1-1/2V filament supply and 3 or 4-1/2 volt escapement supply. Known as the Posi-tac battery box, the pencell size sells for $1. and the size "C" cell unit for $1.25.

CLUB NEWS

One small item we'd like to mention for the benefit of those still flying in hot sunny climes is the use of a piece of Reynolds Wrap aluminum foil placed over the rubber on the wing and around the cabin of your RC job when it's sitting out in the hot sun. This

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aluminum foil will keep down some of the heat which tends to decrease battery life and also will serve to protect the rubber holding on the wing from deteriorating. It's good material to wrap around the motor to protect it from dust and grime during transportation and storage.

The Government Post Office Department, which governs the radio activities of British modelers, has announced that instead of rating a transmitter by the power input to the final stage, it will be rated as to "effective radiated power." For 27 mc this will be 1.5 watts and .5 watts for the 465 mc band. In our opinion this is ample power for all control work and don't say we didn't mention it if such a thing happens in this country.

Last month we mentioned that Mr. Geoff Pike of England broke the endurance record for radio controlled flight. We were a little premature since the existing record must be broken by a 2 per cent increase. However, Mr. Pike did make 1 hour, 32 minutes and 49 seconds. The model was a modified Windjammer sailplane powered with an Amco .87 Mark I Diesel engine, employing an 8 oz. fuel tank. A modified Walker pressure system was used in this 7 ft. model. Radio-wise, the receiver was an ECC hard tube fitted with an E.D. polarized relay. The servo was a modified Fenner-Pike actuator. The transmitter, which had only a 2.2 watt input, provided perfect control directly overhead at an altitude of about 2,500 ft. The flight was made in the evening between 5:41 p.m. and 7:13 p.m. and one third of the fuel was left after the flight landed.

The 9 ft. Cavalier in the photo has a Rockwood five-channel audio receiver in it and is owned by Frank Mall of Chicago. This plane was at the May 16 contest held by the famous Milwaukee Flying Electrons. Vic Weissbrodt, president of the club, announced that the meet drew over 80 active RC fliers and with the help of the Milwaukee Amateur Radio Club, using mobile transmitters, retrieving models was greatly simplified. How come they caint bring 'em back with radio, Paw? Eighty-five per cent of the contestants used single-channel equipment with the other 15 per cent using multi-channel audio equipment. About 60 per cent of the fliers used the Adams actuator, with escapements and motor servos the balance.

It might be the year 'round flying they are able to get in, and then again, it may be the fact that they always seem to be more progressive and are willing to try new things. Who? Why, the West Coast boys, of course. We can remember back in the '30's when they advocated some rather unusual rulings and planes which later became commonplace. From E. L. Rockwood, P.O. Box 6, Menlo Park, Calif., we are given the following gossip. Basically, they go for 5-7 ft. semi-scale jobs with moderate power. Radio equipment of the audio tone type is preferred. This means a trend away from carrier type receivers, although we understand there are a few of our two-tubers still holding their own.

Here's a point by Mr. Rockwood, which we've mentioned before: use as large a cell or battery as possible and do not try to skimp on weight on this item. Alex Schneider is flying a 6 ft. Cub Cruiser type ship with a Rockwood five-channel reed unit. John De Mond has a Live Wire Senior with a five-channel receiver on 52 mc and the plane weighs over 6-1/2 lb. These two ships both have had over 100 flights and their creators specialize in formation flying with them. One up-and-coming RC group is the Pacific Radio Control Society, which represents both planes and boats, using all types of equipment. Another item mentioned by Mr. Rockwood is the possible need for "bonding" movable surfaces to eliminate "unwanted signals." Ground all movable metal surfaces, and even the engine, to the receiver ground. This holds especially true for audio type receivers and certain hard tube carrier type receivers. END

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Scrambler

(*Continued from page* 10)

the templates fit and high spots are eliminated. The blocks should now be split apart and the bottom half cut in two at a spot even with the front side of bulkhead No. 1.

Cut the motor mounts from 5/16 in. square x 10 in. hard maple strips. Taper to 3/16 in. wide at the rear ends. These mounts should be drilled for the motor bolts, and the tank and wing mounting bolts (five holes in each mount). Flanged 4-40 "tee nuts" available in most model shops are perfect for use on these mounts. If not available, then make small nut plates to hold the nuts in place. Mount the engine, spacer and spinner on the motor mounts and then carve the top fuselage block until they can be fitted into place. Cement securely.

The rear of the top fuselage block is slotted and the rudder cemented firmly in place. Make the stabilizer mounting plate and mount three tee nuts on it. Cement this plate into the block at the proper location. Cut out the cockpit area and hollow out the top fuselage block wherever desired for lightness. Install the cockpit floor, instrument panel and bulkhead. These are all of 1/16 in. sheet balsa.

Cut the two fuselage side panels from hard 1/8 in. sheet balsa. From 1/8 in. plywood make the landing gear and tail skid mounting plates. Cement two tee nuts on the tail skid plate and four tee nuts on one of the gear plates. Cut out the various bulkheads as shown on the drawings. For accuracy, bolt the landing gears and the mounting plates together and then cut the rectangular holes in bulkheads Nos. 1 and 3 to fit.

Cement the gear assembly into the bulkheads and pin in place over the top view plans. Add the two side panels and the rest of the bulkheads. Hollow the fuselage blocks as shown. Butt joint and cement the forward part of the fuselage block to bulkhead No. 1. Cut the cowl side panels from 1/16 in. plywood and taper the upper inside edges until they fit tightly against the round fuselage block. Make the lower cowl block of 1/8 in. and 3/8 in. sheets as shown, cement together and carve to shape. Cement the side panels and the block firmly in place on the fuselage.

After all joints are thoroughly dry, remove the fuselage from the plans and remove the landing gear. Notch and cut away the lower fuselage block until it fits into place around the gear plates. Install the tail skid mounting plate and cement the fuselage shell in place. When dry, trim away the excess material from the gear plates and sand smoth, following the contour of the fuselage block.

Cut the various access holes for exhaust, glow plug, needle valve, fill-vent tubes, etc. Check the cowl air vent holes, enlarging if necessary by rounding the front of the lower fuselage block just behind the vents. At the points where the two anchor screws go through the fuselage shell, insert a piece of hard maple or plywood as a bearing surface. Cut away excess material for clearance around the engine, tank, push rods, etc. Pre-assemble the model and bolt together. Make sure at this point that everything fits properly, and that alinement is exact.

Lay out the tank pattern on a sheet of tin cut from an old fuel can. Cut to shape and bend as shown. Solder the tank together except for the rear flap. Punch holes and install the three tubes. Be sure the fill and vent tubes are cut at an angle of 45° to prevent fuel loss in flight. Since all tanks will vary somewhat in capacity because of minor variations in bending, etc., it is best to make a final measurement of the tank before sealing. Pour a measured ounce of fuel into the tank. If the tank is oversize, cut away some of the length at the rear and then bend the flap down and solder in place. Make the mounting bracket and solder it in place on top of the tank.

The cut-off device is a K & B Shur Stop slightly revised and mounted in the fuel line between tank and engine. Remove the trigger, the return spring, and cut away the outlet tube. Remove the stop sleeve and file the end of the plunger down so that when the sleeve is remounted the plunger travel will be restricted to about 3/32 in. This is just enough to provide both open and closed action, but no more. Cut away the excess plunger length and drill the small hole for the actuating push rod. Make the curved tubes and mounting bracket and solder securely to the cut-off body. Mount the cut-off on the rear of one of the crankcase bolts.

The relay used in the original Scrambler was a Leach No. P-3, having 1,280 ohms resistance. Other type relays, of course, can be utilized just as long as they have sufficient power and stroke. The relay should be stripped of any unnecessary weight and then mounted on a small bracket on the lower surface of the wing center section. To the relay, solder an extension arm ending in a small loop. This will connect the push rod to the cut-off. Increase the relay spring tension as much as possible and arrange the stops on the arm to provide about 1/8 in. travel. The secret of reliable action is to provide a linkage with no play, yet with a minimum of friction.

Solder flexible insulated wires from the relay connections to the ends of the lead-in wires where they attach to the nylon bellcrank. The relay in the model is actuated by sending current through the flying wires from a battery in the control handle. Thus, a push on the switch will close the cut-off and shut off the flow of fuel to the engine. The engine will die in approximately two seconds, but if the button is released before the prop stops turning, the engine will catch and restart.

Use two 30-volt hearing aid batteries (Eveready No. 413) wired in series (plus to minus) to give a total of 60 volts. The control handle can be made up with enclosed batteries and switch, or if desired, you can merely tape the two batteries to the lower part of a standard handle. The switch (Microswitch V-3) can be bolted to the top of the handle in a position convenient for thumb operation. Run an insulated wire from one of the flying wire connectors to the batteries, from the batteries to the switch, and from the switch to the other flying wire connector.

One of the connectors must be insulated from the control handle wire by using a small fiber ferrule or spacer.

In order to prevent the flying wires from shorting out against one another, merely

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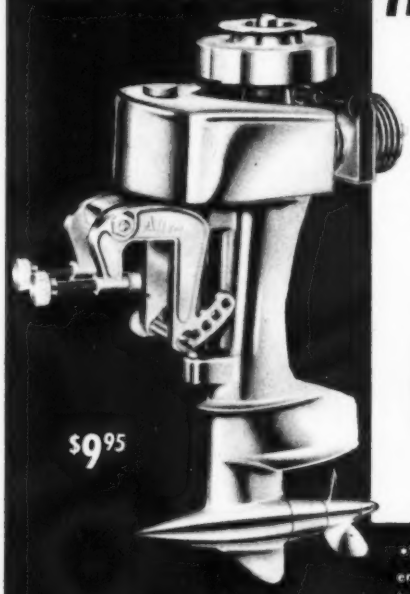

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brush a thin coat of fuelproof clear dope on the rear flying wire. Stretch the wire tight while doing this. Even if this insulation becomes chipped or worn, the slight extra drag of this line will keep it separated from the forward line during flight. The usual type of line fittings are sufficient for electrical connections, provided that no anodized or painted fittings are used. The 60-volt battery set-up makes special jumpers, etc., unnecessary. If you wish to test, operate the cut-off without hooking on the flying wires, then merely bend the ends of two 68-ohm, 1/2-watt resistors into hooks and place these between the control handle and the lead-out wires at the wing tip. These resistors will correctly simulate the resistance of two .012 in. flying wires.

Go over the entire model carefully and fill in any holes or cracks with plastic balsa. Sand until smooth. Cover the cowl, both inside and outside, with nylon. Cover the rest of the model with silk. Mix talcum powder with fuelproof clear dope and give the model several coats. Sand after each coat with No. 400 Wet or Dry paper. When the model is thoroughly smooth and all traces of wood grain and silk pattern are eliminated, spray the model with your favorite colors. The original Scrambler was white with metallic green as shown in the photographs. Cement the dummy pilot and cockpit canopy in place. Place your AMA number on the wing and the rudder. Place large racing numbers on each side of the fuselage. Add other racing type details as desired. Remember that 10 points can be earned for appearance, and these can make the difference when the heat race points are close. Rub the entire model down with a mild compound (Johnson's Car Plate Cleaner) and then give a final coat of wax. Assemble the model and you are ready for the test flight.

Team racing contests are won by models which combine reasonable speed with good economy and by pit crews which can refuel and restart the model in a minimum of time. The average speed for a 140 lap race seldom is faster than 60 mph. A team racer flying 100 mph or more will require from five to eight refueling stops. Each stop of 30 seconds will cost at least 10 laps of flying. A racer flying with good prop, fuel and restrictor combination can easily fly 50 laps per tank and easily make the 140 laps with only two stops.

For the 21 lap heat races, choose a combination of props and fuels that will give about 25 or 26 laps as fast as possible. For the 35 and the 70 lap heat races, shoot for about 39 or 40 laps. For the 140 lap race, choose a combination that will allow 50 or 51 laps per tankful. The original Scrambler flies very well on a Tornado 9-8 molded prop cut down to 8 in. diameter with rather blunt, wide tips. This prop with an economy fuel such as Blue Blazer No. 2 and a restrictor will give good long runs. A Tornado 9-7 cut down to 8 in. diameter will provide more acceleration and, with a hot fuel such as K & B 1000, will provide more speed for the short races.

One quick and easy way to insure fast starts when on the flying line for a race is to pre-run your engine. This should be done in the ready pit, and again when you first reach the flying line. Start your engine, let it run for not more than four or five seconds, and then either grab the spinner or use the cut-off to stop it again. This will slightly warm the engine, and insure that the fuel line is full when you do receive the signal to start engines.

The refueling stops usually make or break a team race. Practice landing your racer at your pit crew's feet. A model can glide a half lap much faster than your crew can sprint it. Four or five laps are usually lost while a pilot runs back and forth to help refuel his model. Train your pit crew to know your model, and then stay in the center ready for a quick take-off. One member of the crew should start to refill the tank while the other is attaching the batteries and starting to crank the engine. The engine can be started before the tank is full and this method will help prevent flooding. Priming the engine when necessary can easily be done by holding a finger over the vent line and pumping an extra squirt into the tank. This forces fuel up the fuel line and into the venturi.

Examine every step in your refueling and restarting technique for possible speed-ups. Remember that every three seconds on the ground cost a lap in the air. A booster jack on the racer will cut the time required to connect the starting batteries. A bulb or a squeeze bottle for filling the tank will be faster than a pump can. Even the extra length

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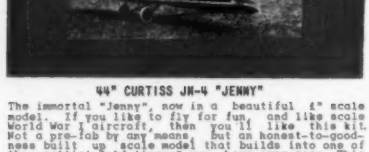

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of most spinner shafts will cost laps during a prop change.

Another item of tremendous help in team racing is a good flight or field box. This box should have a built-in battery plus means for testing for a burned out glow plug without removing the plug from the engine. All tools needed during the refueling stops should be mounted in clips or holders to be at your fingertips when needed. Extra glow plugs and extra props are a must, of course.

We have tried to give you a comprehensive picture of an advanced team racing design. Build your Scrambler slowly and carefully. Be very sure that every part fits correctly and that maximum strength is built into every joint. Take your Scrambler and your pit crew out and practice until you find the combinations that provide maximum performance. Then attend every team racing contest you can, knowing that you, your model and your crew are ready and able to cross that finish line in first place. END

What's New In Speed?

(*Continued from page* 25)

machine oil, for example. The engine should not be taken apart unnecessarily to avoid risking improper alinement.

Very helpful in getting a good engine run are a good needle valve and needle jet. In all classes (except Half-A) it has been found that a Dooling .29 needle valve and jet have improved the adjustment of the engine. The jet can remain straight in Classes B and C, but on both front and rear rotary .19's, it is almost essential to convert the regular jet to a right angle.

A word of caution to those who desire to run a Torp .19. The McCoy right angle jet has a No. 56 drill hole for the jet size. In most instances, this is too large to give a fine adjustment. A Dooling jet has a No. 60 drill hole which makes considerable difference when starting and adjusting this engine with its advance timing set-up. This author made a jet using a No. 63 hole which helped considerably toward a fine adjustment.

There has been a great deal of experimentation with fuels, but it is hard to derive any concrete conclusions. Several stock fuels do very well with certain set-ups. For example, Vick Stanzel test-flew his Monoline Class B ship at speeds of 138-plus mph several times on stock Supersonic 1000 fuels. Many very good flights have been made using Glen Fairebend's race car fuels. Fellows like Frank Stone, Tommy Baker and Earl Cayton do very well with their own private formulae of blast. It is hard to recommend a blend or formula that will fit all situations, but there are some good basic formulae that are worthy of trial. My standard one, when not using stock fuel, is 40 per cent nitro methane, 30 per cent castor oil, 10 per cent oil of mirbane (nitro benzine) and 20 per cent absolute methanol. This can be varied to suit the day. This-Is-It fuel has been found to do very well on hot, dry days. Here in Texas, this type of day is the rule rather than the exception, and I use stock fuel almost exclusively. This is also the same fuel I used on my winning Class B flight at the '53 Nationals.

Glow plugs, likewise, vary with the type of day and fuel, but here are some good combinations that have been established by the expensive cut-and-try method. The Torp .19 seems to do better on a standard blend of fuel with an O & R racing plug. If your fuel is running well but burns a plug every flight, a VG-2 Champion plug will fill the bill very well. Dooling .29's run very well on an O & R racing plug while the McCoy .60 seems to need a colder plug, such as the OK long plug or the Champion VG-2. When you are using oil of mirbane in excess of 5 per cent, there may be some trouble in

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starting the engine on a cold day. It is advisable to use at least two strong No. 6 dry cells in parallel, or a two volt wet cell to heat the glow plug.

One speed flier recommended: "if you burn a plug every flight, the plug is too hot; if the plug lasts more than three flights, it is too cold."

One of the best ways to establish yourself as a real contest winner is always to be prepared when you reach the contest site. A speed flier should try to assemble all of his necessary equipment many weeks before he enters the meet. Things like line reels, starters, facilities for carrying your speed ships, handles, etc., should all be assembled long before the contest season starts. A reliable starter often means the difference between success and failure. You may be able to borrow a starter sometimes, but it is never really available when you need it. This is a good group or team project. The old electric type starter seems to be giving way to the gear box, hand-operated starter. There are many sources for these gear boxes, with the Jack and Hines lightweight type aircraft gear box being the most desirable. However, the old blacksmith bellows gear box can do a very good job. This usually takes a little machine work, but a local machine shop will frequently be able to make the necessary flywheel and hose connection.

Another fine item that will smooth out your procedures at a contest is your line reels. Hall and Massey developed one of the best ideas along this line. They have made a reel about 14 in. in diameter that has four separate channels to hold all classes of lines.

There are two popular methods used to protect airplanes en route to the contest and while on the field. One very fine way is to build a plywood box that will carry all classes of airplanes (illustrated). It is approximately 4x4x1 ft. with both sides being about 6 in. deep. This protects the airplane from any type of damage on the way to the contest. Another popular and more economical way of carrying the airplanes is the one developed by Clem and Beasley. It is the "Prang Bag," which is simply a plastic bag with the draw string sewn in. This protects the airplane from scratches and also keeps the engine free of dust and dirt. Easily adaptable for this is the plastic zipper bag used for sleeping pillow covers. They cost less than a dollar each at any dry goods store. Another method used for transporting airplanes is the hangar type box (illustrated) that shelves the ship by simply sliding the wings into slots that are cut at an angle, so that the weight of the airplane holds it in place.

Now let's carry the beginner in speed through one complete flight. First, the flier should check his fuel, glow plug, pen bladder tank, prop, and tighten all mountings and engine screws before the contest begins. At the contest, the controls should be checked before processing. A test run on the engine may be advisable if the modeler is not very familiar with the starting operation.

The lines are strung out very carefully to prevent sharp bends. The lines are hooked onto the airplane and the handle is adjusted to the neutral position. At this point, the control should be checked several times to insure freedom of movement. A pull-test of 20 times the weight of the airplane should then be made, being very careful to keep the control handle at neutral as this operation could possibly tear loose your elevator horn. After the airplane has been processed, a final check should be made for activity of the glow plug and that the pen bladder tank is not bound too tightly. The dolly should then be tracked as previously mentioned to fit the particular flying field. It is always advisable to have in your pockets a spare prop, a screw driver for taking your airplane

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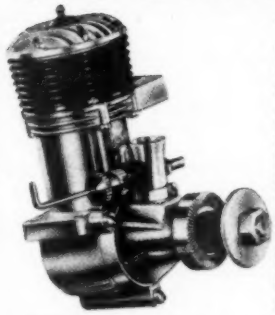

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apart and the necessary equipment to remove the spinner and prop. Also, an extra glow plug and glow plug wrench are frequently very helpful. The lines should be run to check free action and they may be cleaned at the same time with a piece of tissue. The lines should be either held apart or laid on the ground to prevent twisting from vibration when the engine is being started mechanically.

The engine should be started and adjusted just a little on the rich side for the first flight. Instruct your helper to release the airplane and dolly in a straight line, tangent to the circle, and in a motion similar to the release of an ROG free flight launch. Do not shove or push the dolly in any manner as that is the best way to launch a fusillade of metal pans, props and nitro-methane. The ship should be released downwind to provide enough flying speed when it reaches the upwind side of the circle. The airplane should be allowed to roll about 10 ft. at neutral and then gradually give up control until the airplane clears the ground. Immediately neutralize the control and begin to level the airplane. You should have about 15 ft. of altitude when the take-off is completed. Many speed fliers try to hold their airplanes between 1 to 2 ft. off the ground; however, for the beginner, this is too dangerous to warrant the extra speed that may be obtained.

Fly near the maximum altitude allowed by AMA rules for the first few flights until you become familiar with the airplane. The landing of a speed ship is probably the most sensitive operation in the whole flight. Care should be taken to hold the airplane off the ground as long as possible without stalling the ship completely. Never back up after the airplane has touched the ground; just keep the slack out of the lines and be prepared to give a little ground toward the outside of the circle in case the ship starts to flip over.

Immediately after the flight, the ship should be cleaned both inside and out and several drops of machine oil put in both the venturi and the exhaust. The engine should then be plugged up with tissue to seal it off from dust and dirt. Before flying again, make all of the checks that you made on the first flight: the more you fly, the more you will find that this is a good habit to keep.

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Skyray

(*Continued from page* 19)

sure that it is quite upright.

Cut a 1 in. length of hard balsa 1/4 x 1/8 in. and cement this to the left side of the fuselage, over the mounting clip holes. Now screw and cement the clip to the right hand side, so that it is parallel to the lower edge of the fuselage. The version in the photograph has clip on other side, in which case opposite turn adjustments should be made. Cement strips of asbestos paper to the fuselage and the wing, back of the mounting clip, to prevent these parts from becoming scorched.

Cement a paper clip to the underside of the left wing tip as indicated to counterbalance the side-mounted power unit. Push a pin into the top of the fuselage, 1/16 in. behind the first join in the wing sheet. With a loaded motor in place, the model should balance levelly at this point. If tail heavy, unscrew the mounting clip and move it forward slightly. If nose heavy, move the mounting clip back slightly.

Test glide from shoulder height in the usual way, bending the wing trailing edges up or down for trim adjustments. Make the model circle gently right by bending up the right trailing edge a little. Leave the fin at neutral. When you are satisfied with the glide, light the fuel igniter wick, wait for several seconds for the thrust to build up, then launch smoothly on a level keel. A shallow climb to the right should result, followed by a slightly tighter circle in the same direction after the charge is expended. Avoid flying over wet grass as this will cause the wing to warp and spoil the trim.

Contest Calendar

SEPTEMBER

4-6—*Nashville, Tenn.*: Class AA Third Annual Model Aircraft Meet for RC, FFG, FFFS, TLG, OR, PL, CC, OHLG, TR, CLS, combat and CLFS. Carl V. Miller, C.D., 427 Deaderick St., Nashville, Tenn.

5—*Davenport, Ia.*: Class A U-control Meet. Pending.

5—*Ft. Worth, Tex.*: Class AAA Southwestern Model Airplane Contest. W. F. Huffman, C.D., 2613 Cravens Rd., Ft. Worth, Tex. Pending.

5-6—*Monticello, Minn.*: Class AAA Sixth Upper Midwest PAA Load Meet for PL and RC. W. H. Billett, C.D., 2548 Nicollet Ave., Minneapolis, Minn.

5-6—*Miami, Fla.*: Second Hurricane Meet. William J. Lumley, C.D., 9028 N. W. 22nd Ave., Miami, Fla. Pending.

5-6—*Salt Lake City, Utah*: Class AA Ute Aeromodelers' Second Annual Model Air Show for FFG, PL, TLG, RC, CLS, combat, CL and CLFS. Robert J. Barney, C.D., 1322 Wasach Ave., Salt Lake City, Utah.

6—*Far Hills, N. J.*: Class AA Bedminster-Far Hills Lions Club Annual Control Line Meet for CL, beauty, CLS, TR and combat. Nelson Wortman, C.D., Far Hills, N. J.

12—*Perth Amboy, N. J.*: Class AAA Third Annual Flying Olympics for CL, CLS, combat and beauty. James Froehlich, C.D., P. O. Box 358, Fort Monmouth, N. J.

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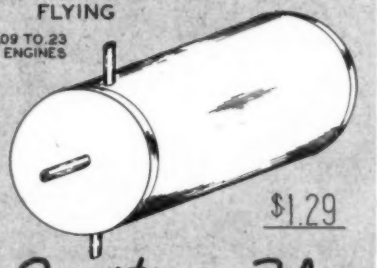

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12—*Boston, Ind.*: Class AA Springfield Strato-Hawks' Tenth Annual Contest for FFG, OR and OHLG. Charles Greetham, C.D., 119 E. Cecil St., Springfield, O.

12—*Hicksville, N. Y.*: Class AAA Screamin' Demons of Long Island Annual Meet for FFG, OR, OHLG, RC and PL. Paul E. Del Gatto, C.D., 123 Margaret Dr., E. Meadow, L. I., N. Y.

12—*Wichita, Kan.*: Class AA Second Annual Wichihawks Model Airplane Meet for CL, CLS, combat, FFG, TLG, OR, RC and OHLG. Wm. R. Weaver, C.D., 611 S. Lightner Dr., Wichita, Kan.

12—*Bakersfield, Calif.*: Bakersfield Record Trials for FFG, TLG, OR and OHLG. Clinton Merrill, C.D., 212 Washington, Oildale, Calif.

12—*Jamestown, N. Y.*: Class AA contest. Clayton Berlinghoff, C.D., 140 Newton Ave., Jamestown, N. Y. Pending.

12—*Winston-Salem, N. C.*: Class AA Fifth Annual Free Flight Winston-Salem Meet for FFG, OR and RC. Lloyd B. Hathaway, C.D., City Recreation Dept., City Hall, Winston-Salem, N. C.

19—*Sacramento, Calif.*: Class AA Northern California Free Flight Council Meet for FFG, OR, TLG. John Lenderman, C.D., P. O. Box 216, French Camp, Calif.

19—*Tulsa, Okla.*: Class A Second Annual Tulsa Glue Dobbers' Nordic Towline Glider Meet. Entry is restricted to residents of Oklahoma. Willard H. Kehr, C.D., 4940 N. Johnstown, Tulsa, Okla.

19—*Grand Mound, Ia.*: Class A Illinois-Iowa Aeronautical Asso. Free Flight Meet for FFG, OHLG, TLG and OR. Entry is restricted to members of IIAA. Elmer J. Christenson, C.D., 808 27th Ave., Moline, Ill.

25—*Bayville, L. I., N. Y.*: Class AA Second Annual Screamin' Demons' Long Island Sound Hydro Championships for FFG ROW, PL ROW, flying boats and RC ROW. Donald J. McGovern, C.D., 81-53 242 St., Bellerose Manor, N. Y.

26—*Fresno, Calif.*: Fresno Gas Model Club Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

OCTOBER

10—*Bakersfield, Calif.*: Bakersfield Record Trials for FFG, TLG, OR and OHLG. Clinton Merrill, C.D., 212 Washington, Oildale, Calif.

24—*Sacramento, Calif.*: Class AA Northern California Free Flight Council Meet for FFG, OR and TLG. John Lenderman, C.D., P. O. Box 216, French Camp, Calif.

31—*Fresno, Calif.*: Fresno Gas Model Club Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

31—*Tulsa, Okla.*: Class AA First Annual Tulsa Glue Dobbers' Radio Control Meet. Willard H. Kehr, C.D., 4940 N. Johnstown, Tulsa, Okla.

KEY TO LISTING OF EVENTS: FFG—Free Flight Gas; CL—Controlline Speed; OR—Outdoor Rubber; TLG—Towline Glider; IR—Indoor Rubber; OHLG—Outdoor Hand-Launched Glider; IHLG—Indoor Hand-Launched Glider; CLS—Controlline Precision (Stunt); CLFS—Controlline Flying Scale; RC—Radio Control; TR—Team Racing; FFFS—Free Flight Flying Scale; PL—PAA Load; CC—PAA Clipper Cargo; NC—Navy Carrier.

Contests designated "Pending" mean the application is before the proper authorities as we go to press; "Record Trials" mean no prizes but a chance at cracking the records; "Class A" is a meet with restricted entry; "Class AA" is a meet with unrestricted entry; "Class AAA" is a state-wide or regional meet; "Class AAAA" is national or international.

Maybe

(*Continued from page* 14)

base for the front landing gear.

The stabilizer was permanently cemented in place to forestall any change in position, and also because weight on the tail must be kept to a minimum.

It was noticed, and 60 in. models—flown successfully in RC as well—bear this out, that the Drake's wing center section was best, as any wing that has the motor mounted on it has more tendency to shift out of position unless it is properly mounted. After tapering the protruding ends of the leading edge, spar and trailing edge to the correct angle to get proper dihedral, pin the wing panels on the plans and mount a piece of strip wood against the trailing edge side of the spar, so that it fits from the work board to the top of the root ribs in height and butt join to both root ribs. Then put the motor pod in position and follow through as in the construction of the Drake. Sheet the bottom of the wing center section first. The wing fairing is made only after the fuselage is finished so that you get the correct shape. Only the wings and stabilizer are covered.

Covering may be gas model Silkspan or any similar tough paper obtainable at the

hobby shop, although silk will be much prettier and stronger, if you don't mind the added expense. If a Diesel is used, fuelproofing or fuelproof dope is not necessary. With glow, use either a fuelproof dope, such as Sta or Aerogloss, or apply fuelproofer. After clear doping all wood parts, color dope the entire ship.

Now check the CG and add weight, if necessary, until the ship balances. Do not compensate by changing the wing incidence as the change in the line of thrust will result in poor flying characteristics. Bend the rudder tab slightly to the left and fly under low power. On ROG's, first push the model to see if it tracks straight. Check this also after a rough landing. Model will ROG straight ahead, even in wind, and climb sharply to about 100 ft., then level off and bank to whichever side the rudder tab is set. This rudder tab setting must be found by careful experimentation.

FAI RESULTS

		Times (Sec.)					Total
1.	Carl Wheeley, U.S.A.	180	135	180	180	169	844
2.	Silvio Lanfranchi, Switzerland	180	118	180	173	180	831
3.	Dave Kneeland, U.S.A.	180	180	142	180	101	783
4.	John Gorham, G. Brit. (Bill Dean)	180	180	119	180	64	723
5.	Alan King, Australia	180	92	148	60	180	650
6.	Francisco Stajer, Argentina	112	92	180	138	107	629
7.	Bill Etherington, Canada	180	180	88	.....	180	628
8.	Jose Meduri, Argentina	47	151	180	94	130	602
9.	Rolf Hagel, Sweden (Anders Hakanson)	113	180	48	80	180	601
10.	Oscar Lastra, Argentina	62	72	101	180	180	595

WAKEFIELD RESULTS

		Times (Sec.)					Total
1.	Alan King, Australia	180	180	180	180	180	900
2.	Charles Jackson, G. Britain (Carl Hermes)	146	180	180	180	180	866
3.	Allan Lim Joon, Australia (Manuel Andrade)	180	143	180	180	180	863
4.	John Upton, New Zealand (George Reich)	180	180	180	124	180	844
5.	Bob Dunham, U.S.A.	120	175	180	180	180	835
6.	Arne Blomgren, Sweden	180	146	180	128	180	814
7.	Philip Joyce, Canada	180	180	141	180	125	806
8.	Fabi Mursep, Argentina	152	169	120	180	180	801
9.	Dick Baxter, U.S.A.	180	180	177	180	81	798
10.	Warren Gillespie, U.S.A.	123	138	180	180	150	771

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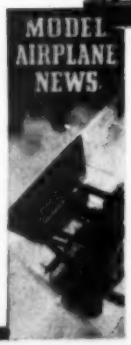

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Flash News

(*Continued from page 38*)

Westinghouse J46 engines of more than 4,000 lb. thrust each, replacing the 3,000-lb. J34's originally used. Convair is studying a redesigned version of the *Sea Dart* powered by a single Pratt & Whitney J57 or Wright J67 turbojet engine in the 10-12,000-lb. class and featuring a single hydro-ski, instead of the pair used on the prototype. The Navy is sticking by its original decision to place the delta-wing fighter into production but will make a thorough evaluation of these design changes before proceeding.

Republic is looking to its new F-105 fighter-bomber as competition for the North American F-100C and the two planes have similar design histories. Both started out as famous fighters (Republic F-84 *Thunderjet* and North American F-86 *Sabre*) to which a wing with 45° sweep was to be fitted. The process of change resulted in so many additional alterations that the end product (F-100 and F-105) is a virtually new airplane. New F-105 is powered by Allison J71 turbojet of 10,000 lb. thrust and features an interchangeable nose that can contain either cameras or armament, both for tactical missions.

The Civil Aeronautics Board recently revealed that during 1952 more than 10 times as many people were killed on bicycles than in airplanes. Other statistics show that more people die in their bathtubs every year than in airplanes.

Air Force is sponsoring a design competition for drone fighter planes to act as decoys for enemy radar. Launching of dozens of such supersonic drones in a variety of directions during a raid (akin to the use of "window" in WW II) could thoroughly confuse enemy radar. About a dozen U.S. manufacturers are submitting designs for the competition, which could result in orders numbered in the thousands. END

MAN at Work

(*Continued from page 6*)

are, of course, handicapped by the reduction of glider towlines from 100 to 50 metres, engine run from 20 to 15 seconds, and (probably most drastic of all) a definite limitation on rubber weight in Wakefield models."

But judging by what we saw at Suffolk, the rules have had unexpected effects. That's the trouble with drastic rule changes: the effects are to be presumed, and these have to be imagined and analyzed. The old three-flight deal enabled the rounds to be flown relatively free of thermals. But with five rounds, the flying went on all day, and you know about American mid-day thermals. Victory in FAI depended on thermals.

* * *

▸ During its 25-year history, MAN has had many firsts, a recent example being Tom Purcell's ducted fan that made possible gas engined jet type models, without propellers. As much as any magazine likes to be the first with a new stunt, we'd like to tell you why MAN feels it important not to rush into print with anything that has not been thoroughly developed. Noting that a ducted fan control-line job has yet to be published by MAN, these comments from designer Jim Moynihan point up the behind-the-scenes headaches involved in such a development project:

"I believe that it is very possible to produce a U-control ducted fan job but it will be dead from a good performance standpoint," says Jim.

"The ducted fan itself is critical in performance when the inlet outlet areas are not of the proper size. The fan itself is critical, but for the moment, let us assume the ideal situation exists and that we have a workable fan. From the fan to the exhaust end of the duct should be a run of the same diameter as at the fan and should be kept as short as possible and the interior should be as smooth as possible. The inlet area at the fuselage nose can't be big enough. The optimum is to have the fan up front, which, of course, ends up as a regular prop again. Therefore, it's easy to see trouble coming. If the inlet area up front is less than a minimum of one and one-half of the fan and exit area, performance suffers. Remember through all this that area diminishes as the square of the diameter. If the diameter is cut in half, the area resulting is one quarter of what you started with. So the average prototype jet has a big round middle but a small nose intake, a poor set-up. As a result, most jets with the exception of the Rooshians' MIGs, et al, are not very well suited for a ducted fan. The inlet area *relative* to the fan disc area is what controls thrust, assuming an exit area equal to the fan disc area, and it is also the requirement which eliminates most prototype jets. A big fuselage means little unless accompanied by an equally large inlet area.

"Now, to build those ships which are suited to fan work," Jim goes on, "we are confronted with the problem of enclosing a 5 in. diameter fan (.19 engine) in a fuselage. At the least, the fuselage thickness must be 1/4 in. This means a diameter of 5-1/2 in. absolute minimum. Even this calls for interior planking and construction details well outside of the capabilities of any but an old timer at balsa butchering. The fan must be close running to preserve efficiency and reduce tip losses, and construction must allow for care enough to preclude any possibility of a mistake in clearance. Only one can happen per fuselage with this type of propulsion. Could be built-up type with ring formers, planked inside and outside, or probably best would be the fiberglass-covered balsa fuselage hollowed out fireball style. Any way it is done, it isn't easy and it *must* be accurate."

One of these days... END

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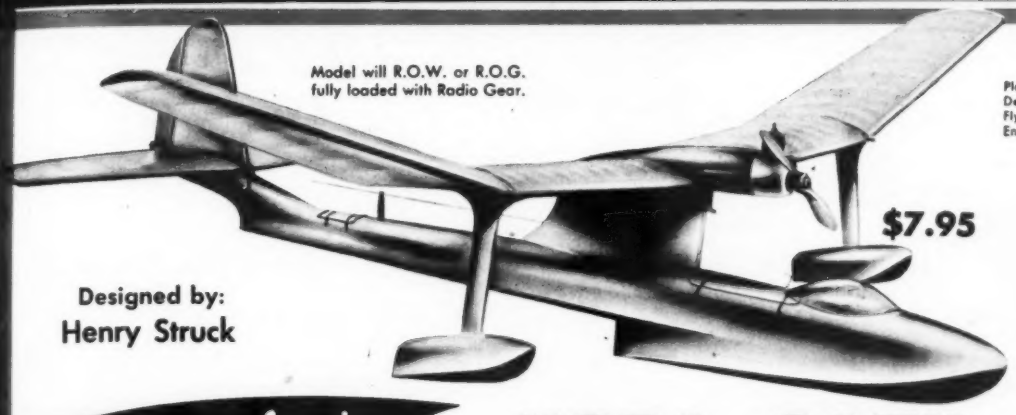

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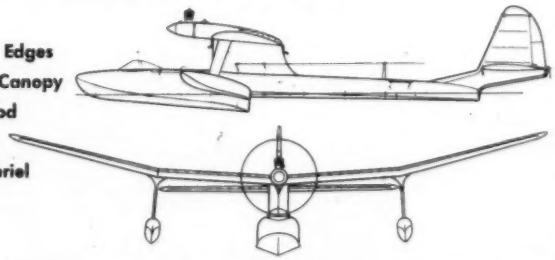

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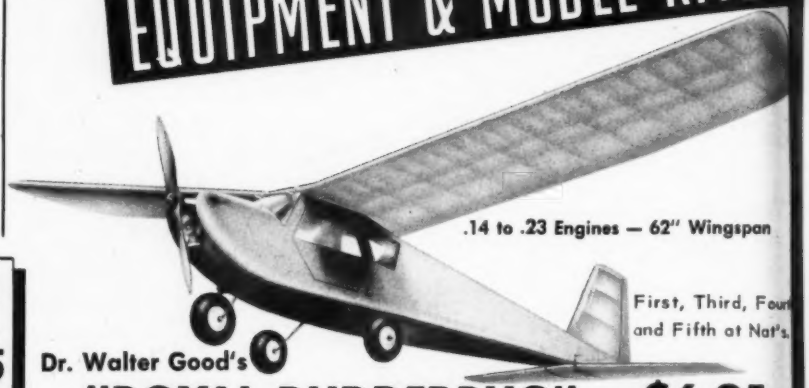
DE-Super Aerotrol Combination Kit—#201-K

Combination Receiver-Transmitter Kit that sells for **$29.95**

Includes everything found in both DE-202K and DE-203K Kits. By buying them together it saves you **$3.95**



.14 to .23 Engines — 62" Wingspan

First, Third, Four and Fifth at Nat's.

Dr. Walter Good's

"ROYAL RUDDERBUG" $6.95

The entire model building world knows and respects Dr. Walt Good, many-time National R.C. Champion and re-knowned physicist. His new design is the best size for all-'round performance with single channel equipment.

The newest version of one of the most popular R.C. jobs ever designed. Simplified in construction, and improved in performance. A fine kit, produced to Berkeley's standards of completeness and engineering exactness.

READY-TO-OPERATE

SUPER AEROTROL

Including: **$49.95**

TRANSMITTER; ANTENNA; RECEIVER; ESCAPEMENT; & O-3 MILLIAMMETER.

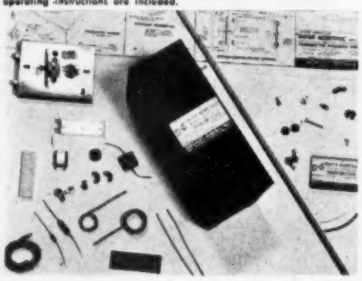
Super Aerotrol Crystal Controlled

TRANSMITTER

In Kit Form less tube **$19.95**

- **Portable — Self contained — No separate antenna — No external Batteries!**
- **Operates on 27.2 mc.**
- **Weighs 3.5 lbs.**

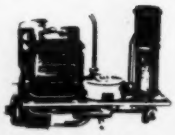
Kit includes all necessary parts (except tube and batteries): Precision Ground Crystal; Painted Metal Cabinet; Finished Sectional Antenna; stamped and formed chassis with all holes punched; all necessary components, resistors, condensers, coils and chokes; color coded wiring. Can be assembled in less than two hours. Complete building and operating instructions are included.



"Super Aerotrol" Dust Core Tuned

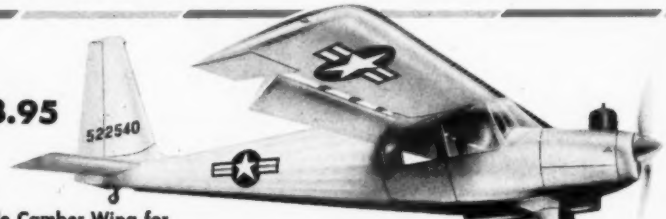
RECEIVER

In Kit Form less tube **$13.95**



- **NEW "locked-channel" dust-core tuning.**
- **Light in Weight, 2¾ oz. less batteries.**
- **Super-regenerator circuit, dependable.**

Kit includes: Finished, tested sensitive relay; finished dust-core tuner; drilled bakelite base with condensers and eyelets attached; all electrical components, condensers, resistors, coils, chokes and potentiometer; all necessary contacts, and color-coded wiring. Can be assembled in less than two hours. Complete instructions are included.



$3.95

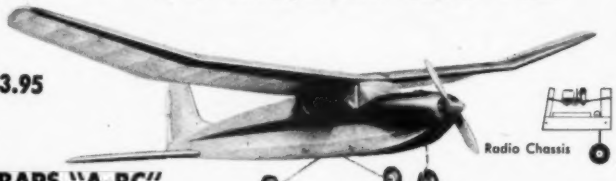
Variable Camber Wing for Radio Control Flying!

Slotted flaps may be depressed 10° for free-flight; depressed 25° for slow speed radio control flying; or raised 5° for high speed radio control flight.

Army Liaison YL-24

"HELIOPLANE"

For .049 to .14 Engines 38¾" Wingspan—1" Scale



$3.95

Radio Chassis

BOOTSTRAPS "A-RC"

For .09 to .14 Engines — 54" Wingspan

(Empty weight 21 oz. — Radio, Equip., 14 oz. max.)

Split rudder tab for separate trim adjustments. Clip-in prone engine mount, tri-cycle gear.

SEA BIRD "RC-28"

"A-B" Race Boat —

For .09 to .35 Engines — 28" Length

$3.95

- **Pre-Fabricated Mahogany Veneer Covering**
- **Completely Pre-Fabricated Balsa & Plywood**
- **Full Size Plans Including Radio Control Details**

Designed for Radio Control!

The Sea Bird "RC-28" was designed for use either with or without radio control. Simple to build, it enables the builder to race the boat the next day after he buys the kit!

buy **BERKELEY** at your local dealer!

If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept. MA., West Hempstead, N. Y. Please include 25¢ packing & postage.

Get Champion Performance with K & B Supersonic Fuels

K&B SUPERSONIC FUELS

AGAIN WORLD'S CHAMPION POWER ENGINE...

K & B TORPEDO .15

$10.95 AT YOUR HOBBY DEALER

INTERNATIONAL WORLD POWER CHAMPIONSHIPS • Westhampton, L. I., N. Y.

Torpedo .15 again world's champion, placing first, second, and third in the F.A.I. Gas finals.

1st—Carl Wheeley, U. S. A.
2nd—Silveo Lanfranchi, Switzerland
3rd—David Kneeland, U. S. A.

U. S. A. team again the first place winners, all flying Torpedo .15.

K & B *Supersonic Fuels* do deliver more power. Here's the proof! Championship performance in competition year after year after year. Look at the Official Record... MORE FIRST PLACES WON AT THE 1951... 1952... 1953 NATIONALS THAN ANY OTHER BRANDS!

...a fuel for every engine... every use!

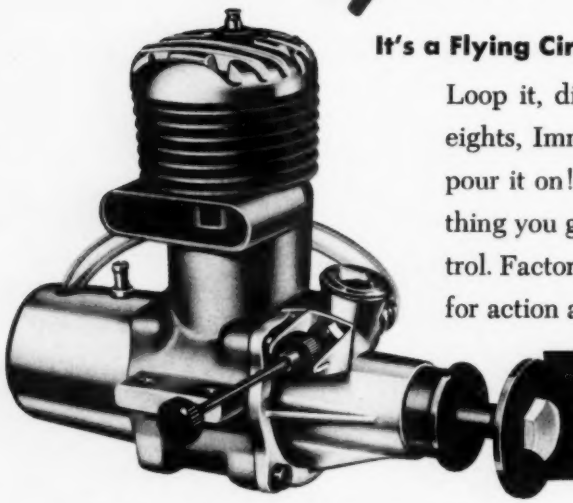
SUPERSONIC ULTRA-GLO, *for ½A engines*. . ½ pts. 55¢, pts. 90¢
SUPERSONIC 1000 . . . *for speed—it's HOT*. . ½ pts. 60¢, pts. 1.00
SUPERSONIC 100 . . . *for free flight*. . . . . ½ pts. 50¢, pts. 80¢
U-control, scale models

TORPEDO K-B ENGINES

K&B MANUFACTURING COMPANY
224 E. PALMER AVE., COMPTON, CALIFORNIA

Acrobat of the Air!

McCOY SuperStunt "29" SPORTSMAN



It's a Flying Circus... the Sport Engine that does Everything!

Loop it, dive it, steep climb it or power dive it... do figure eights, Immelmanns, snap rolls or fly inverted. In fact... just pour it on! The new McCoy "29" *Sportsman* will take everything you give it in stunt, free flight, team racing or radio control. Factory flight tests under contest conditions make it ready for action and assure you the best in flying.

Note new design front plate with longer crankshaft. Superior port timing means quicker starts, extra power. Greater fuel suction makes intricate maneuvers easy.

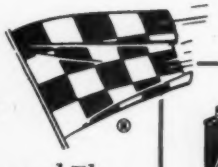
A STUNTING MARVEL BECAUSE:

A two-ringed aluminum piston with hollow wrist pin and forged aluminum con rod make the "29" a balanced, smooth-running engine. The carefully micro-honed sleeve delivers higher compression and extra power in this longer-lasting, trouble-free performer.

With new front plate design and bronze bearing, plus non-critical needle valve... the "29" *Sportsman* proves a sensational aerialist.

ALL THIS EXTRA FLYING FUN AND STILL...

ONLY $11.95 Complete with fuel tank.



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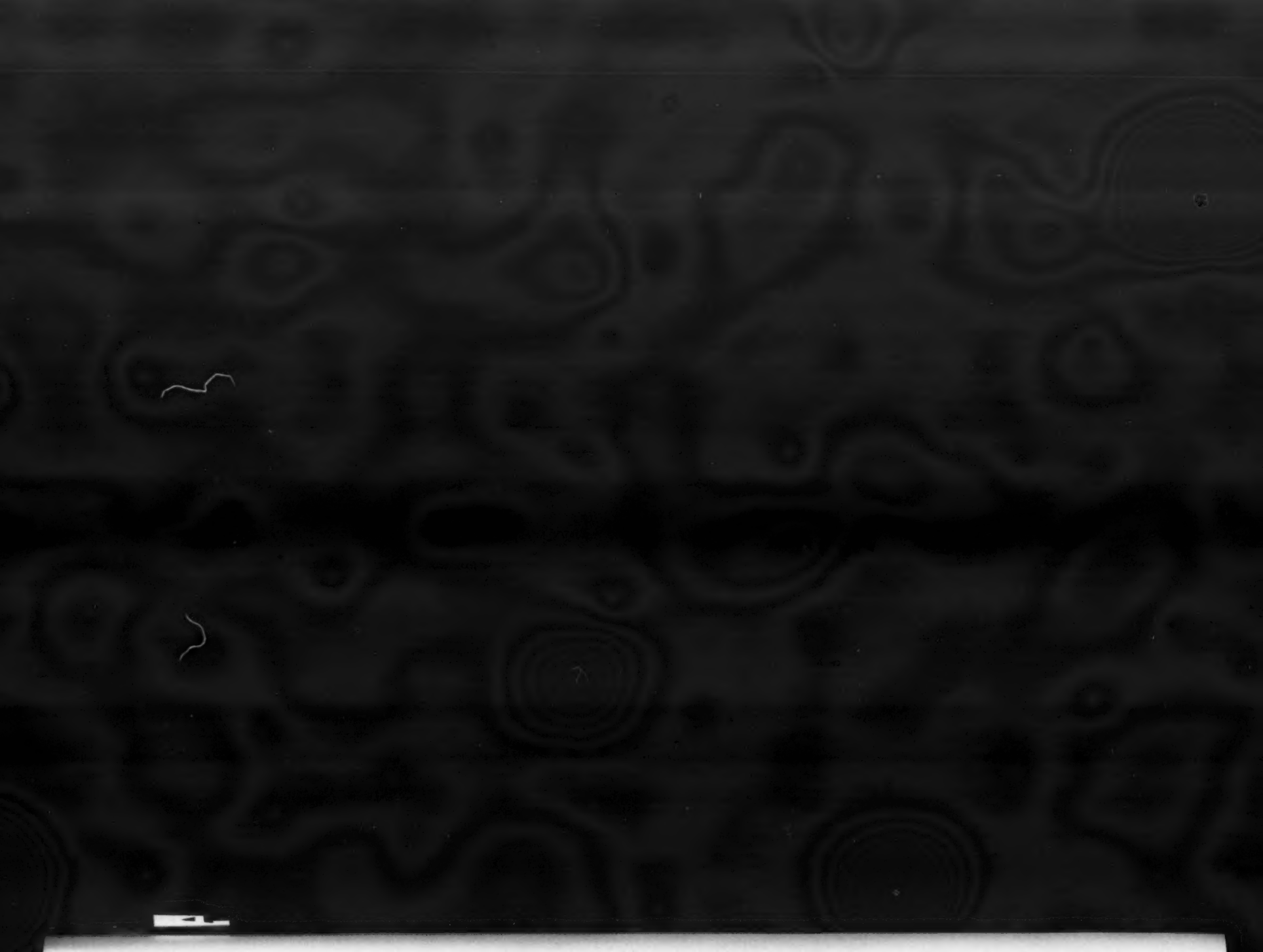
Buy and Fly a Checkered Flag Line Engine

For top performance make sure you use McCoy *Glo Fuel.* Pts. 90¢. ½ Pts. 50¢.

Prop Suggestions

Stunt ..... 9" x 6"
Free Flight ... 9" x 4"
Radio 9" x 4", 10" x 4"
Team Racing 9" x 7", 9" x 8"